

SEQUENCE LISTING

<110> O'Donnell, Michael E.

Yuzhakov, Alexander

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Bruck, Irina

Kuriyan, John

<120> ENZYMES DERIVED FROM THERMOPHILIC ORGANISMS THAT
FUNCTION AS A CHROMOSOMAL REPLICASE, PREPARATION AND
USE THEREOF

<130> 22221/1030

<140> 09/716,964

<141> 2000-11-21

<150> 60/143,202

<151> 1997-04-08

<150> 08/823,407

<151> 1997-04-08

<150> 09/057,416

<151> 1998-04-08

<160> 212

<170> PatentIn Ver. 2.1

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<211> 2007

<212> DNA

<213> *Thermus thermophilus*

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<213> *Thermus thermophilus*

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35 40 45

Lys Thr Thr Thr Ala Arg Leu Leu Ala Met Ala Val Gly Cys Gln Gly
50 55 60

Glu Asp Pro Pro Cys Gly Val Cys Pro His Cys Gln Ala Val Gln Arg
 65 70 75 80

Gly Ala His Pro Asp Val Val Asp Ile Asp Ala Ala Ser Asn Asn Ser
 85 90 95

Val Glu Asp Val Arg Glu Leu Arg Glu Arg Ile His Leu Ala Pro Leu
100 105 110

Ser Ala Pro Arg Lys Val Phe Ile Leu Asp Glu Ala His Met Leu Ser
115 120 125

Lys Ser Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro Pro Pro
130 135 140

His Val Leu Phe Val Phe Ala Thr Thr Glu Pro Glu Arg Met Pro Pro
145 150 155 160

Thr Ile Leu Ser Arg Thr Gln His Phe Arg Phe Arg Arg Leu Thr Glu
165 170 175

Glu Glu Ile Ala Phe Lys Leu Arg Arg Ile Leu Glu Ala Val Gly Arg
180 185 190

Glu Ala Glu Glu Glu Ala Leu Leu Leu Ala Arg Leu Ala Asp Gly
195 200 205

Ala Leu Arg Asp Ala Glu Ser Leu Leu Glu Arg Phe Leu Leu Leu Glu
210 215 220

Gly Pro Leu Thr Arg Lys Glu Val Glu Arg Ala Leu Gly Ser Pro Pro
225 230 235 240

Gly Thr Gly Val Ala Glu Ile Ala Ala Ser Leu Ala Arg Gly Lys Thr
245 250 255

Ala Glu Ala Leu Gly Leu Ala Arg Arg Leu Tyr Gly Glu Gly Tyr Ala
260 265 270

Pro Arg Ser Leu Val Ser Gly Leu Leu Glu Val Phe Arg Glu Gly Leu
275 280 285

Tyr Ala Ala Phe Gly Leu Ala Gly Thr Pro Leu Pro Ala Pro Pro Gln
290 295 300

Ala Leu Ile Ala Ala Met Thr Ala Leu Asp Glu Ala Met Glu Arg Leu
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Ala Arg Arg Ser Asp Ala Leu Ser Leu Glu Val Ala Leu Leu Glu Ala
325 330 335

Gly Arg Ala Leu Ala Ala Glu Ala Leu Pro Gln Pro Thr Gly Ala Pro
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Ser Pro Glu Val Gly Pro Lys Pro Glu Ser Pro Pro Thr Pro Glu Pro
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 Pro Arg Pro Glu Glu Ala Pro Asp Leu Arg Glu Arg Trp Arg Ala Phe
 370 375 380

 Leu Glu Ala Leu Arg Pro Thr Leu Arg Ala Phe Val Arg Glu Ala Arg
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 Pro Glu Val Arg Glu Gly Gln Leu Cys Leu Ala Phe Pro Glu Asp Lys
 405 410 415

 Ala Phe His Tyr Arg Lys Ala Ser Glu Gln Lys Val Arg Leu Leu Pro
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 Gly Glu Lys Lys Ser Leu Ser Pro Arg Pro Arg Pro Ala Pro Pro Pro
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 Glu Ala Ala Glu Glu Ala Pro Glu Glu Ala Leu Arg Arg Val Val Arg
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<212> DNA
<213> *Thermus thermophilus*

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 <213> Thermus thermophilus

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Gly	Arg	Leu	Ala	Gln	Ala	Tyr	Leu	Phe	Ser	Gly	Pro	Arg	Gly	Val	Gly
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35															

Lys	Thr	Thr	Thr	Ala	Arg	Leu	Leu	Ala	Met	Ala	Val	Gly	Cys	Gln	Gly
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Glu	Asp	Pro	Pro	Cys	Gly	Val	Cys	Pro	His	Cys	Gln	Ala	Val	Gln	Arg
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Gly	Ala	His	Pro	Asp	Val	Val	Asp	Ile	Asp	Ala	Ala	Ser	Asn	Asn	Ser
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Val Glu Asp Val Arg Glu Leu Arg Glu Arg Ile His Leu Ala Pro Leu
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Ser Ala Pro Arg Lys Val Phe Ile Leu Asp Glu Ala His Met Leu Ser
115 120 125

Lys Ser Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro Pro Pro
130 135 140

His Val Leu Phe Val Phe Ala Thr Thr Glu Pro Glu Arg Met Pro Pro
145 150 155 160

Thr Ile Leu Ser Arg Thr Gln His Phe Arg Phe Arg Arg Leu Thr Glu
165 170 175

Glu Glu Ile Ala Phe Lys Leu Arg Arg Ile Leu Glu Ala Val Gly Arg
180 185 190

Glu Ala Glu Glu Ala Leu Leu Leu Ala Arg Leu Ala Asp Gly
195 200 205

Ala Leu Arg Asp Ala Glu Ser Leu Leu Glu Arg Phe Leu Leu Leu Glu
210 215 220

Gly Pro Leu Thr Arg Lys Glu Val Glu Arg Ala Leu Gly Ser Pro Pro
225 230 235 240

Gly Thr Gly Val Ala Glu Ile Ala Ala Ser Leu Ala Arg Gly Lys Thr
245 250 255

Ala Glu Ala Leu Gly Leu Ala Arg Arg Leu Tyr Gly Glu Gly Tyr Ala
260 265 270

Pro Arg Ser Leu Val Ser Gly Leu Leu Glu Val Phe Arg Glu Gly Leu
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Tyr Ala Ala Phe Gly Leu Ala Gly Thr Pro Leu Pro Ala Pro Pro Gln
290 295 300

Ala Leu Ile Ala Ala Met Thr Ala Leu Asp Glu Ala Met Glu Arg Leu
305 310 315 320

Ala Arg Arg Ser Asp Ala Leu Ser Leu Glu Val Ala Leu Leu Glu Ala
325 330 335

Gly Arg Ala Leu Ala Ala Glu Ala Leu Pro Gln Pro Thr Gly Ala Pro
340 345 350

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390															395
Pro	Glu	Val	Arg	Glu	Gly	Gln	Leu	Cys	Leu	Ala	Phe	Pro	Glu	Asp	Lys
405															415
410															
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Leu	Ala	Gln	Ala	His	Phe	Gly	Val	Glu	Glu	Val	Val	Leu	Val	Leu	Glu
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<213> *Thermus thermophilus*

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Gly	Arg	Leu	Ala	Gln	Ala	Tyr	Leu	Phe	Ser	Gly	Pro	Arg	Gly	Val	Gly
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Lys	Thr	Thr	Thr	Ala	Arg	Leu	Leu	Ala	Met	Ala	Val	Gly	Cys	Gln	Gly
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Glu	Asp	Pro	Pro	Cys	Gly	Val	Cys	Pro	His	Cys	Gln	Ala	Val	Gln	Arg
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Gly	Ala	His	Pro	Asp	Val	Val	Asp	Ile	Asp	Ala	Ala	Ser	Asn	Asn	Ser

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90

95

Val Glu Asp Val Arg Glu Leu Arg Glu Arg Ile His Leu Ala Pro Leu
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Ser Ala Pro Arg Lys Val Phe Ile Leu Asp Glu Ala His Met Leu Ser
 115 120 125

Lys Ser Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro Pro Pro
 130 135 140

His Val Leu Phe Val Phe Ala Thr Thr Glu Pro Glu Arg Met Pro Pro
 145 150 155 160

Thr Ile Leu Ser Arg Thr Gln His Phe Arg Phe Arg Arg Leu Thr Glu
 165 170 175

Glu Glu Ile Ala Phe Lys Leu Arg Arg Ile Leu Glu Ala Val Gly Arg
 180 185 190

Glu Ala Glu Glu Glu Ala Leu Leu Leu Ala Arg Leu Ala Asp Gly
 195 200 205

Ala Leu Arg Asp Ala Glu Ser Leu Leu Glu Arg Phe Leu Leu Leu Glu
 210 215 220

Gly Pro Leu Thr Arg Lys Glu Val Glu Arg Ala Leu Gly Ser Pro Pro
 225 230 235 240

Gly Thr Gly Val Ala Glu Ile Ala Ala Ser Leu Ala Arg Gly Lys Thr
 245 250 255

Ala Glu Ala Leu Gly Leu Ala Arg Arg Leu Tyr Gly Glu Gly Tyr Ala
 260 265 270

Pro Arg Ser Leu Val Ser Gly Leu Leu Glu Val Phe Arg Glu Gly Leu
 275 280 285

Tyr Ala Ala Phe Gly Leu Ala Gly Thr Pro Leu Pro Ala Pro Pro Gln
 290 295 300

Ala Leu Ile Ala Ala Met Thr Ala Leu Asp Glu Ala Met Glu Arg Leu
 305 310 315 320

Ala Arg Arg Ser Asp Ala Leu Ser Leu Glu Val Ala Leu Leu Glu Ala
 325 330 335

Gly Arg Ala Leu Ala Ala Glu Ala Leu Pro Gln Pro Thr Gly Ala Pro

340 345 350
Ser Pro Glu Val Gly Pro Lys Pro Glu Ser Pro Pro Thr Pro Glu Pro
355 360 365

Pro Arg Pro Glu Glu Ala Pro Asp Leu Arg Glu Arg Trp Arg Ala Phe
370 375 380

Leu Glu Ala Leu Arg Pro Thr Leu Arg Ala Phe Val Arg Glu Ala Arg
385 390 395 400

Pro Glu Val Arg Glu Gly Gln Leu Cys Leu Ala Phe Pro Glu Asp Lys
405 410 415

Ala Phe His Tyr Arg Lys Ala Ser Glu Gln Lys Val Arg Leu Leu Pro
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Leu Ala Gln Ala His Phe Gly Val Glu Glu Val Val Leu Val Leu Glu
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Gly Glu Lys Lys Lys Ala
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<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

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<210> 7
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: peptide

<400> 7
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<210> 8
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 8
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<210> 9
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: peptide

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<210> 10
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<212> DNA
<213> Artificial Sequence

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<223> Description of Artificial Sequence: primer

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<210> 11
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

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<213> Artificial Sequence

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<210> 13
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<213> Artificial Sequence

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<223> Description of Artificial Sequence: primer

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<210> 14
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<223> Description of Artificial Sequence: primer

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<210> 15
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<213> Artificial Sequence

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<210> 16
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<212> DNA
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<220>
<223> Description of Artificial Sequence: primer

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<210> 17
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<210> 18
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<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: peptide

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<210> 19

<211> 180

<212> PRT

<213> Escherichia coli

<400> 19

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Ser Leu Gly Arg Ile His His Ala Tyr Leu Phe Ser Gly Thr Arg Gly
35 40 45

Val Gly Lys Thr Ser Ile Ala Arg Leu Leu Ala Lys Gly Leu Asn Cys
50 55 60

Glu Thr Gly Ile Thr Ala Thr Pro Cys Gly Val Cys Asp Asn Cys Arg
65 70 75 80

Glu Ile Glu Gln Gly Arg Phe Val Asp Leu Ile Glu Ile Asp Ala Ala
85 90 95

Ser Arg Thr Lys Val Glu Asp Thr Arg Asp Leu Leu Asp Asn Val Gln
100 105 110

Tyr Ala Pro Ala Arg Gly Arg Phe Lys Val Tyr Leu Ile Asp Glu Val
115 120 125

His Met Leu Ser Arg His Ser Phe Asn Ala Leu Leu Lys Thr Leu Glu
130 135 140

Glu Pro Pro Glu His Val Lys Phe Leu Leu Ala Thr Thr Asp Pro Gln
145 150 155 160

Lys Leu Pro Val Thr Ile Leu Ser Arg Cys Leu Gln Phe His Leu Lys
165 170 175

Ala Leu Asp Val
180

<210> 20
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<213> Bacillus subtilis

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20 25 30

Leu Gln Lys Lys Phe Ser His Ala Tyr Leu Phe Ser Gly Pro Arg Gly
35 40 45

Thr Gly Lys Thr Ser Ala Ala Lys Ile Phe Ala Lys Ala Val Asn Cys
50 55 60

Glu His Ala Pro Val Asp Glu Pro Cys Asn Glu Cys Ala Ala Cys Lys
65 70 75 80

Gly Ile Thr Asn Gly Ser Ile Ser Asp Val Ile Glu Ile Asp Ala Ala
85 90 95

Ser Asn Asn Gly Val Asp Glu Ile Arg Asp Ile Arg Asp Lys Val Lys
100 105 110

Phe Ala Pro Ser Ala Val Thr Tyr Lys Val Tyr Ile Ile Asp Glu Val
115 120 125

His Met Leu Ser Ile Gly Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu
130 135 140

Glu Pro Pro Glu His Cys Ile Phe Ile Leu Ala Thr Thr Glu Pro His
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Lys Ile Pro Leu Thr Ile Ile Ser Arg Cys Gln Arg Phe Asp Phe Lys
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Arg Ile Thr Ser
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<210> 21
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<212> PRT

<213> Escherichia coli

<400> 21

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Ser	Arg	Thr	Lys	Val	Glu	Asp	Thr	Arg	Asp	Leu	Leu	Asp	Asn	Val	Gln
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Tyr	Ala	Pro	Ala	Arg	Gly	Arg	Phe	Lys	Val	Tyr	Leu	Ile	Asp	Glu	Val
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His	Met	Leu	Ser	Arg	His	Ser	Phe	Asn	Ala	Leu	Leu	Lys	Thr	Leu	Glu
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Glu	Pro	Pro	Glu	His	Val	Lys	Phe	Leu	Leu	Ala	Thr	Thr	Asp	Pro	Gln
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Lys	Leu	Pro	Val	Thr	Ile	Leu	Ser	Arg	Cys	Leu	Gln	Phe	His	Leu	Lys
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Ala	Leu	Asp	Val	Glu	Gln	Ile	Arg	His	Gln	Leu	Glu	His	Ile	Leu	Asn
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Glu	Glu	His	Ile	Ala	His	Glu	Pro	Arg	Ala	Leu	Gln	Leu	Leu	Ala	Arg
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Ala	Ala	Glu	Gly	Ser	Leu	Arg	Asp	Ala	Leu	Ser	Leu	Thr	Asp	Gln	Ala
		210				215					220				
Ile	Ala	Ser	Gly	Asp	Gly	Gln	Val	Ser	Thr	Gln	Ala	Val	Ser	Ala	Met
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Leu Gly Thr Leu Asp Asp Asp Gln Ala Leu Ser Leu Val Glu Ala Met
245 250 255

Val Glu Ala Asn Gly Glu Arg Val Met Ala Leu Ile Asn Glu Ala Ala
260 265 270

Ala Arg Gly Ile Glu Trp Glu Ala Leu Leu Val Glu Met Leu Gly Leu
275 280 285

Leu His Arg Ile Ala Met
290

<210> 22
<211> 294
<212> PRT
<213> Haemophilus influenzae

<400> 22
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Asp Val Val Gly Gln Glu His Ile Ile Thr Ala Leu Ala Asn Gly Leu
20 25 30

Lys Asp Asn Arg Leu His His Ala Tyr Leu Phe Ser Gly Thr Arg Gly
35 40 45

Val Gly Lys Thr Ser Ile Ala Arg Leu Phe Ala Lys Gly Leu Asn Cys
50 55 60

Val His Gly Val Thr Ala Thr Pro Cys Gly Glu Cys Glu Asn Cys Lys
65 70 75 80

Ala Ile Glu Gln Gly Asn Phe Ile Asp Leu Ile Glu Ile Asp Ala Ala
85 90 95

Ser Arg Thr Lys Val Glu Asp Thr Arg Glu Leu Leu Asp Asn Val Gln
100 105 110

Tyr Lys Pro Val Val Gly Arg Phe Lys Val Tyr Leu Ile Asp Glu Val
115 120 125

His Met Leu Ser Arg His Ser Phe Asn Ala Leu Leu Lys Thr Leu Glu
130 135 140

Glu Pro Pro Glu Tyr Val Lys Phe Leu Leu Ala Thr Thr Asp Pro Gln
145 150 155 160

Lys Leu Pro Val Thr Ile Leu Ser Arg Cys Leu Gln Phe His Leu Lys
 165 170 175

 Ala Leu Asp Glu Thr Gln Ile Ser Gln His Leu Ala His Ile Leu Thr
 180 185 190

 Gln Glu Asn Ile Pro Phe Glu Asp Pro Ala Leu Val Lys Leu Ala Lys
 195 200 205

 Ala Ala Gln Gly Ser Ile Arg Asp Ser Leu Ser Leu Thr Asp Gln Ala
 210 215 220

 Ile Ala Met Gly Asp Arg Gln Val Thr Asn Asn Val Val Ser Asn Met
 225 230 235 240

 Leu Gly Leu Leu Asp Asp Asn Tyr Ser Val Asp Ile Leu Tyr Ala Leu
 245 250 255

 His Gln Gly Asn Gly Glu Leu Leu Met Arg Thr Leu Gln Arg Val Ala
 260 265 270

 Asp Ala Ala Gly Asp Trp Asp Lys Leu Leu Gly Glu Cys Ala Glu Lys
 275 280 285

 Leu His Gln Ile Ala Leu
 290

<210> 23
 <211> 294
 <212> PRT
 <213> Bacillus subtilis

<400> 23
 Met Ser Tyr Gln Ala Leu Tyr Arg Val Phe Arg Pro Gln Arg Phe Glu
 1 5 10 15

 Asp Val Val Gly Gln Glu His Ile Thr Lys Thr Leu Gln Asn Ala Leu
 20 25 30

 Leu Gln Lys Lys Phe Ser His Ala Tyr Leu Phe Ser Gly Pro Arg Gly
 35 40 45

 Thr Gly Lys Thr Ser Ala Ala Lys Ile Phe Ala Lys Ala Val Asn Cys
 50 55 60

 Glu His Ala Pro Val Asp Glu Pro Cys Asn Glu Cys Ala Ala Cys Lys

65	70	75	80
Gly Ile Thr Asn Gly Ser Ile Ser Asp Val Ile Glu Ile Asp Ala Ala			
85	90	95	
Ser Asn Asn Gly Val Asp Glu Ile Arg Asp Ile Arg Asp Lys Val Lys			
100	105	110	
Phe Ala Pro Ser Ala Val Thr Tyr Lys Val Tyr Ile Ile Asp Glu Val			
115	120	125	
His Met Leu Ser Ile Gly Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu			
130	135	140	
Glu Pro Pro Glu His Cys Ile Phe Ile Leu Ala Thr Thr Glu Pro His			
145	150	155	160
Lys Ile Pro Leu Thr Ile Ile Ser Arg Cys Gln Arg Phe Asp Phe Lys			
165	170	175	
Arg Ile Thr Ser Gln Ala Ile Val Gly Arg Met Asn Lys Ile Val Asp			
180	185	190	
Ala Glu Gln Leu Gln Val Glu Glu Gly Ser Leu Glu Ile Ile Ala Ser			
195	200	205	
Ala Ala His Gly Gly Met Arg Asp Ala Leu Ser Leu Leu Asp Gln Ala			
210	215	220	
Ile Ser Phe Ser Gly Asp Ile Leu Lys Val Glu Asp Ala Leu Leu Ile			
225	230	235	240
Thr Gly Ala Val Ser Gln Leu Tyr Ile Gly Lys Leu Ala Lys Ser Leu			
245	250	255	
His Asp Lys Asn Val Ser Asp Ala Leu Glu Thr Leu Asn Glu Leu Leu			
260	265	270	
Gln Gln Gly Lys Asp Pro Ala Lys Leu Ile Glu Asp Met Ile Phe Tyr			
275	280	285	
Phe Arg Asp Met Leu Leu			
290			

<210> 24
<211> 300
<212> PRT

<213> Caulobacter crescentus

<400> 24

Asp	Ala	Tyr	Thr	Val	Leu	Ala	Arg	Lys	Tyr	Arg	Pro	Arg	Thr	Phe	Glu
1				5					10						15
Asp	Leu	Ile	Gly	Gln	Glu	Ala	Met	Val	Arg	Thr	Leu	Ala	Asn	Ala	Phe
		20					25						30		
Ser	Thr	Gly	Arg	Ile	Ala	His	Ala	Phe	Met	Leu	Thr	Gly	Val	Arg	Gly
		35				40						45			
Val	Gly	Lys	Thr	Thr	Thr	Ala	Arg	Leu	Leu	Ala	Arg	Ala	Leu	Asn	Tyr
		50				55					60				
Glu	Thr	Asp	Thr	Val	Lys	Gly	Pro	Ser	Val	Asp	Leu	Thr	Thr	Glu	Gly
		65			70				75				80		
Tyr	His	Cys	Arg	Ser	Ile	Ile	Glu	Gly	Arg	His	Met	Asp	Val	Leu	Glu
		85					90					95			
Leu	Asp	Ala	Ala	Ser	Arg	Thr	Lys	Val	Asp	Glu	Met	Arg	Glu	Leu	Leu
		100					105				110				
Asp	Gly	Val	Arg	Tyr	Ala	Pro	Val	Glu	Ala	Arg	Tyr	Lys	Val	Tyr	Ile
		115				120					125				
Ile	Asp	Glu	Val	His	Met	Leu	Ser	Thr	Ala	Ala	Phe	Asn	Ala	Leu	Leu
		130				135					140				
Lys	Thr	Leu	Glu	Glu	Pro	Pro	Pro	His	Ala	Lys	Phe	Ile	Phe	Ala	Thr
		145			150				155			160			
Thr	Glu	Ile	Arg	Lys	Val	Pro	Val	Thr	Ile	Leu	Ser	Arg	Cys	Gln	Arg
		165				170					175				
Phe	Asp	Leu	Arg	Arg	Val	Glu	Pro	Asp	Val	Leu	Val	Lys	His	Phe	Asp
		180				185					190				
Arg	Ile	Ser	Ala	Lys	Glu	Gly	Ala	Arg	Ile	Glu	Met	Asp	Ala	Leu	Ala
		195				200					205				
Leu	Ile	Ala	Arg	Ala	Ala	Glu	Gly	Ser	Val	Arg	Asp	Gly	Leu	Ser	Leu
		210				215				220					
Leu	Asp	Gln	Ala	Ile	Val	Gln	Thr	Glu	Arg	Gly	Gln	Thr	Val	Thr	Ser
		225				230			235			240			

Thr Val Val Arg Asp Met Leu Gly Leu Ala Asp Arg Ser Gln Thr Ile			
245	250	255	
Ala Leu Tyr Glu His Val Met Ala Gly Lys Thr Lys Asp Ala Leu Glu			
260	265	270	
Gly Phe Arg Ala Leu Trp Gly Phe Gly Ala Asp Pro Ala Val Val Met			
275	280	285	
Leu Asp Val Leu Asp His Cys His Ala Ser Ala Val			
290	295	300	
<210> 25			
<211> 260			
<212> PRT			
<213> Mycoplasma genitalium			
<400> 25			
Met His Gln Val Phe Tyr Gln Lys Tyr Arg Pro Ile Asn Phe Lys Gln			
1	5	10	15
Thr Leu Gly Gln Glu Ser Ile Arg Lys Ile Leu Val Asn Ala Ile Asn			
20	25	30	
Arg Asp Lys Leu Pro Asn Gly Tyr Ile Phe Ser Gly Glu Arg Gly Thr			
35	40	45	
Gly Lys Thr Thr Phe Ala Lys Ile Ile Ala Lys Ala Ile Asn Cys Leu			
50	55	60	
Asn Trp Asp Gln Ile Asp Val Cys Asn Ser Cys Asp Val Cys Lys Ser			
65	70	75	80
Ile Asn Thr Asn Ser Ala Ile Asp Ile Val Glu Ile Asp Ala Ala Ser			
85	90	95	
Lys Asn Gly Ile Asn Asp Ile Arg Glu Leu Val Glu Asn Val Phe Asn			
100	105	110	
His Pro Phe Thr Phe Lys Lys Val Tyr Ile Leu Asp Glu Ala His			
115	120	125	
Met Leu Thr Thr Gln Ser Trp Gly Gly Leu Leu Lys Thr Leu Glu Glu			
130	135	140	
Ser Pro Pro Tyr Val Leu Phe Ile Phe Thr Thr Glu Phe Asn Lys			
145	150	155	160

Ile	Pro	Leu	Thr	Ile	Leu	Ser	Arg	Cys	Gln	Ser	Phe	Phe	Phe	Lys	Lys	
				165					170					175		
Ile	Thr	Ser	Asp	Leu	Ile	Leu	Glu	Arg	Leu	Asn	Asp	Ile	Ala	Lys	Lys	
				180					185					190		
Glu	Lys	Ile	Lys	Ile	Glu	Lys	Asp	Ala	Leu	Ile	Lys	Ile	Ala	Asp	Leu	
				195					200					205		
Ser	Gln	Gly	Ser	Leu	Arg	Asp	Gly	Leu	Ser	Leu	Leu	Asp	Gln	Leu	Ala	
				210					215					220		
Ile	Ser	Leu	Ile	Val	Lys	Lys	Leu	Val	Leu	Leu	Met	Leu	Lys	Lys	His	
				225	.				230					235		240
Leu	Ile	Ser	Leu	Ile	Glu	Met	Gln	Asn	Leu	Leu	Leu	Leu	Lys	Gln	Phe	
				245					250					255		
Tyr	Gln	Glu	Ile													
				260												
<210> 26																
<211> 289																
<212> PRT																
<213> Thermus thermophilus																
<400> 26																
Val	Ser	Ala	Leu	Tyr	Arg	Arg	Phe	Arg	Pro	Leu	Thr	Phe	Gln	Glu	Val	
1				5					10					15		
Val	Gly	Gln	Glu	His	Val	Lys	Glu	Pro	Leu	Leu	Lys	Ala	Ile	Arg	Glu	
					20				25					30		
Gly	Arg	Leu	Ala	Gln	Ala	Tyr	Leu	Phe	Ser	Gly	Pro	Arg	Gly	Val	Gly	
					35				40					45		
Lys	Thr	Thr	Thr	Ala	Arg	Leu	Leu	Ala	Met	Ala	Val	Gly	Cys	Gln	Gly	
					50				55					60		
Glu	Asp	Pro	Pro	Cys	Gly	Val	Cys	Pro	His	Cys	Gln	Ala	Val	Gln	Arg	
					65				70					75		80
Gly	Ala	His	Pro	Asp	Val	Val	Asp	Ile	Asp	Ala	Ala	Ser	Asn	Asn	Ser	
					85				90					95		
Val	Glu	Asp	Val	Arg	Glu	Leu	Arg	Glu	Arg	Ile	His	Leu	Ala	Pro	Leu	

100	105	110
Ser Ala Pro Arg Lys Val Phe Ile Leu Asp Glu Ala His Met Leu Ser		
115	120	125
Lys Ser Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro Pro Pro		
130	135	140
His Val Leu Phe Val Phe Ala Thr Thr Glu Pro Glu Arg Met Pro Pro		
145	150	155
Thr Ile Leu Ser Arg Thr Gln His Phe Arg Phe Arg Arg Leu Thr Glu		
165	170	175
Glu Glu Ile Ala Phe Lys Leu Arg Arg Ile Leu Glu Ala Val Gly Arg		
180	185	190
Glu Ala Glu Glu Glu Ala Leu Leu Leu Ala Arg Leu Ala Asp Gly		
195	200	205
Ala Leu Arg Asp Ala Glu Ser Leu Leu Glu Arg Phe Leu Leu Leu Glu		
210	215	220
Gly Pro Leu Thr Arg Lys Glu Val Glu Arg Ala Leu Gly Ser Pro Pro		
225	230	235
Gly Thr Gly Val Ala Glu Ile Ala Ala Ser Leu Ala Arg Gly Lys Thr		
245	250	255
Ala Glu Ala Leu Gly Leu Ala Arg Arg Leu Tyr Gly Glu Gly Tyr Ala		
260	265	270
Pro Arg Ser Leu Val Ser Gly Leu Leu Glu Val Phe Arg Glu Gly Leu		
275	280	285
Tyr		

<210> 27
 <211> 94
 <212> DNA
 <213> Thermus thermophilus

<400> 27
 gccggaggga gaaaaaaaaa gccgagccca aggccccgcc cggccccacc ccgaagcgcc 60
 cgcaccccccgg ggcggcccgaa ggaggaggagg agg 94

<210> 28
<211> 11
<212> PRT
<213> Thermus thermophilus

<400> 28
Val Leu Glu Gly Glu Lys Lys Ser Leu Ser Pro
1 5 10

<210> 29
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<220>
<221> unsure
<222> (6)
<223> N at position 6 is either G or C

<220>
<221> unsure
<222> (12)
<223> N at position 12 is either G or C

<220>
<221> unsure
<222> (21)
<223> N at position 21 is either G or C

<400> 29
cacgcntacc tnttctccgg nac

23

<210> 30
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<220>
<221> unsure

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<222> (7)
<223> N at position 7 is either G or C

<220>
<221> unsure
<222> (10)
<223> N at position 10 is either G or C

<220>
<221> unsure
<222> (19)
<223> N at position 19 is either G or C

<220>
<221> unsure
<222> (22)
<223> N at position 22 is either G or C

<400> 30
gtgctcnggn ggctcctcnt cngtc
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25

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<210> 31
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 31
gtggatccg tggttctgga tctcgatgaa gaa
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33

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<210> 32
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 32
gtggatcca cggsctstcs gagcagaag
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29

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<210> 33
<211> 34
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 33
gcgggatcct caacgaggac ctctccatct tcaa 34

<210> 34
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 34
gcgggatcct tgtcgtsag sgtsagsgcg tcgta 35

<210> 35
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 35
gggaaggacc agcgcgtact cccccctgctc ctaggtgtg 39

<210> 36
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 36
gtgtggatcc ttcttcttsc ccatsgc 27

<210> 37
<211> 27

<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 37
caccgattcc agtggtgccct aggtgtg

27

<210> 38
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 38
caacacacctgg tggccagga gcctgtgctt

30

<210> 39
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 39
ccagaatcg ctgctggtcg tag

23

<210> 40
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 40
agcacccctgg aggagcttc

19

<210> 41
<211> 19

<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 41
catgtcgtac tgggtgtac

19

<210> 42
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<220>
<221> unsure
<222> (7)
<223> N at position 7 is A, C, G, or T

<220>
<221> unsure
<222> (8)
<223> N at position 8 is A, C, G, or T

<220>
<221> unsure
<222> (13)
<223> N at position 13 is A, C, G, or T

<220>
<221> unsure
<222> (14)
<223> N at position 14 is A, C, G, or T

<400> 42
gtsgtsnnsg acnnsgagac sacsggg

27

<210> 43
<211> 27
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<220>

<221> unsure

<222> (8)

<223> N at position 8 is A, C, G, or T

<220>

<221> unsure

<222> (9)

<223> N at position 9 is A, C, G, or T

<220>

<221> unsure

<222> (17)

<223> N at position 17 is A, C, G, or T

<220>

<221> unsure

<222> (18)

<223> N at position 18 is A, C, G, or T

<400> 43

gaasccsnng tcgaasnngg cgttgtg

27

<210> 44

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 44

cggggatcca cctcaatcac ctcgtgg

27

<210> 45

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 45

cggggatccg ccaccttgcg gctccgggtg

30

28

<210> 46
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 46
cgctctaga cgagttccca aagcgtgcgg t 31

<210> 47
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 47
cgcgtctaga tcacaccttat ccaga 25

<210> 48
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 48
gcggcgcata tggtggttgtt cctggacctg gag 33

<210> 49
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 49
cgcgtctaga tcacaccttat ccaga 25

<210> 50
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 50
gtscctsgtsa agacscactt 20

<210> 51
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 51
sagsagsgcg ttgaasgtgt g 21

<210> 52
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 52
ctcgttggtg aaagttccg tg 22

<210> 53
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 53
ctcgttggtg aaagttccg tg 22

<210> 54
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 54
tctggcaaca cgttctggag cacatcc 27

<210> 55
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 55
tgctggcggtt catcttcagg atg 23

<210> 56
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 56
catcctgaag atgaacgcca gca 23

<210> 57
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 57
aggtttatcca caggggtcat gtgca 25

<210> 58
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 58
gtgtgtcata tgaacataaac gttcccaa

29

<210> 59
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 59
gcgcgaattc tcccttgtgg aaggcttag

29

<210> 60
<211> 13
<212> PRT
<213> Thermus thermophilus

<400> 60
Arg Val Glu Leu Asp Tyr Asp Ala Leu Thr Leu Asp Asp
1 5 10

<210> 61
<211> 14
<212> PRT
<213> Thermus thermophilus

<400> 61
Phe Phe Ile Glu Ile Gln Asn His Gly Leu Ser Glu Gln Lys
1 5 10

<210> 62
<211> 8

<212> PRT
<213> Thermus thermophilus

<400> 62
Phe Phe Ile Glu Ile Gln Asn His
1 5

<210> 63
<211> 8
<212> PRT
<213> Thermus thermophilus

<400> 63
Tyr Asp Ala Leu Thr Leu Asp Asp
1 5

<210> 64
<211> 6
<212> PRT
<213> Thermus thermophilus

<400> 64
Ala Met Gly Lys Lys Lys
1 5

<210> 65
<211> 9
<212> PRT
<213> Thermus thermophilus

<400> 65
Phe Asn Lys Ser His Ser Ala Ala Tyr
1 5

<210> 66
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: peptide

<220>
<221> PEPTIDE

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<222> (3)
<223> Xaa at position 3 is undefined

<220>
<221> PEPTIDE
<222> (5)
<223> Xaa at position 5 is undefined

<400> 66
Val Val Xaa Asp Xaa Glu Thr Thr Gly
    1           5

<210> 67
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: peptide

<220>
<221> PEPTIDE
<222> (4)
<223> Xaa at position 4 is undefined

<220>
<221> PEPTIDE
<222> (7)
<223> Xaa at position 7 is undefined

<400> 67
His Asn Ala Xaa Phe Asp Xaa Gly Phe
    1           5

<210> 68
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: peptide

<220>
<221> PEPTIDE
<222> (3)
<223> Xaa at position 3 is undefined
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<220>
<221> PEPTIDE
<222> (5)
<223> Xaa at position 5 is undefined

<400> 68
Val Val Xaa Asp Xaa Glu Thr Thr Gly
1 5

<210> 69
<211> 7
<212> PRT
<213> Thermus thermophilus

<400> 69
Val Leu Val Lys Thr His Leu
1 5

<210> 70
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: peptide

<400> 70
His Arg Ala Leu Tyr Asp
1 5

<210> 71
<211> 7
<212> PRT
<213> Thermus thermophilus

<400> 71
His Thr Phe Asn Ala Leu Leu
1 5

<210> 72
<211> 34
<212> PRT
<213> Escherichia coli

<400> 72
Asp Arg Tyr Phe Leu Glu Leu Ile Arg Thr Gly Arg Pro Asp Glu Glu
1 5 10 15

Ser Tyr Leu His Ala Ala Val Glu Leu Ala Glu Ala Arg Gly Leu Pro
20 25 30

Val Val

<210> 73
<211> 34
<212> PRT
<213> Vibrio cholerae

<400> 73
Asp His Phe Tyr Leu Glu Leu Ile Arg Thr Gly Arg Ala Asp Glu Glu
1 5 10 15

Ser Tyr Leu His Phe Ala Leu Asp Val Ala Glu Gln Tyr Asp Leu Pro
20 25 30

Val Val

<210> 74
<211> 34
<212> PRT
<213> Haemophilus influenzae

<400> 74
Asp His Phe Tyr Leu Ala Leu Ser Arg Thr Gly Arg Pro Asn Glu Glu
1 5 10 15

Arg Tyr Ile Gln Ala Ala Leu Lys Leu Ala Glu Arg Cys Asp Leu Pro
20 25 30

Leu Val

<210> 75
<211> 34
<212> PRT
<213> Rickettsia prowazekii

<400> 75
Asp Arg Phe Tyr Phe Glu Ile Met Arg His Asp Leu Pro Glu Glu Gln
1 5 10 15

Phe Ile Glu Asn Ser Tyr Ile Gln Ile Ala Ser Glu Leu Ser Ile Pro
20 25 30

Ile Val

<210> 76
<211> 34
<212> PRT
<213> Helicobacter pylori

<400> 76
Asp Asp Phe Tyr Leu Glu Ile Met Arg His Gly Ile Leu Asp Gln Arg
1 5 10 15

Phe Ile Asp Glu Gln Val Ile Lys Met Ser Leu Glu Thr Gly Leu Lys
20 25 30

Ile Ile

<210> 77
<211> 34
<212> PRT
<213> Synechocystis sp.

<400> 77
Asp Asp Tyr Tyr Leu Glu Ile Gln Asp His Gly Ser Val Glu Asp Arg
1 5 10 15

Leu Val Asn Ile Asn Leu Val Lys Ile Ala Gln Glu Leu Asp Ile Lys
20 25 30

Ile Val

<210> 78
<211> 34
<212> PRT
<213> Mycobacterium tuberculosis

<400> 78
Asp Asn Tyr Phe Leu Glu Leu Met Asp His Gly Leu Thr Ile Glu Arg
1 5 10 15

Arg Val Arg Asp Gly Leu Leu Glu Ile Gly Arg Ala Leu Asn Ile Pro
20 25 30

Pro Leu

<210> 79
<211> 46
<212> PRT
<213> Escherichia coli

<400> 79
Asn Lys Arg Arg Ala Lys Asn Gly Glu Pro Pro Leu Asp Ile Ala Ala
1 5 10 15

Ile Pro Leu Asp Asp Lys Lys Ser Phe Asp Met Leu Gln Arg Ser Glu
20 25 30

Thr Thr Ala Val Phe Gln Leu Glu Ser Arg Gly Met Lys Asp
35 40 45

<210> 80
<211> 46
<212> PRT
<213> Vibrio cholerae

<400> 80
Asn Pro Arg Leu Lys Lys Ala Gly Lys Pro Pro Val Arg Ile Glu Ala
1 5 10 15

Ile Pro Leu Asp Asp Ala Arg Ser Phe Arg Asn Leu Gln Asp Ala Lys
20 25 30

Thr Thr Ala Val Phe Gln Leu Glu Ser Arg Gly Met Lys Glu
35 40 45

<210> 81
<211> 46
<212> PRT
<213> Haemophilus influenzae

<400> 81
Asn Val Arg Met Val Arg Glu Gly Lys Pro Arg Val Asp Ile Ala Ala
1 5 10 15

Ile Pro Leu Asp Asp Pro Glu Ser Phe Glu Leu Leu Lys Arg Ser Glu
20 25 30

Thr Thr Ala Val Phe Gln Leu Glu Ser Arg Gly Met Lys Asp
35 40 45

<210> 82

<211> 46

<212> PRT

<213> Rickettsia prowazekii

<400> 82

Cys Lys Lys Leu Leu Lys Glu Gln Gly Ile Lys Ile Asp Phe Asp Asp
1 5 10 15

Met Thr Phe Asp Asp Lys Lys Thr Tyr Gln Met Leu Cys Lys Gly Lys
20 25 30

Gly Val Gly Val Phe Gln Phe Glu Ser Ile Gly Met Lys Asp
35 40 45

<210> 83

<211> 45

<212> PRT

<213> Helicobacter pylori

<400> 83

Leu Lys Ile Ile Lys Thr Gln His Lys Ile Ser Val Asp Phe Leu Ser
1 5 10 15

Leu Asp Met Asp Asp Pro Lys Val Tyr Lys Thr Ile Gln Ser Gly Asp
20 25 30

Thr Val Gly Ile Phe Gln Ile Glu Ser Gly Met Phe Gln
35 40 45

<210> 84

<211> 46

<212> PRT

<213> Synechocystis sp.

<400> 84
Gln Glu Arg Lys Ala Leu Gln Ile Arg Ala Arg Thr Gly Ser Lys Lys
1 5 10 15

Leu Pro Asp Asp Val Lys Lys Thr His Lys Leu Leu Glu Ala Gly Asp
20 25 30

Leu Glu Gly Ile Phe Gln Leu Glu Ser Gln Gly Met Lys Gln
35 40 45

<210> 85

<211> 46

<212> PRT

<213> Mycobacterium tuberculosis

<400> 85

Ile Asp Asn Val Arg Ala Asn Arg Gly Ile Asp Leu Asp Leu Glu Ser
1 5 10 15

Val Pro Leu Asp Asp Lys Ala Thr Tyr Glu Leu Leu Gly Arg Gly Asp
20 25 30

Thr Leu Gly Val Phe Gln Leu Asp Gly Gly Pro Met Arg Asp
35 40 45

<210> 86

<211> 3729

<212> DNA

<213> Thermus thermophilus

<400> 86

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<210> 87
<211> 1245
<212> PRT
<213> Thermus thermophilus

<400> 87
Met Gly Arg Glu Leu Arg Phe Ala His Leu His Gln His Thr Gln Phe
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Ser Leu Leu Asp Gly Ala Pro Lys Leu Ser Asp Leu Leu Lys Trp Val
20 25 30

Glu Glu Thr Thr Pro Glu Asp Pro Ala Leu Ala Met Thr Asp His Gly
35 40 45

Asn Leu Phe Gly Ala Val Glu Phe Tyr Lys Lys Ala Thr Glu Met Gly
50 55 60

Ile Lys Pro Ile Leu Gly Tyr Glu Ala Tyr Val Ala Ala Glu Ser Arg
65 70 75 80

Phe Asp Arg Lys Arg Gly Lys Gly Leu Asp Gly Gly Tyr Phe His Leu
85 90 95

Thr Leu Leu Ala Lys Asp Phe Thr Gly Tyr Gln Asn Leu Val Arg Leu
100 105 110

Ala Ser Arg Ala Tyr Leu Glu Gly Phe Tyr Glu Lys Pro Arg Ile Asp
115 120 125

Arg Glu Ile Leu Arg Glu His Ala Glu Gly Leu Ile Ala Leu Ser Gly
130 135 140

Cys Leu Gly Ala Glu Ile Pro Gln Phe Ile Leu Gln Asp Arg Leu Asp
145 150 155 160

Leu Ala Glu Ala Arg Leu Asn Glu Tyr Leu Ser Ile Phe Lys Asp Arg
165 170 175

Phe Phe Ile Glu Ile Gln Asn His Gly Leu Pro Glu Gln Lys Lys Val
180 185 190

Asn Glu Val Leu Lys Glu Phe Ala Arg Lys Tyr Gly Leu Gly Met Val
195 200 205

Ala Thr Asn Asp Gly His Tyr Val Arg Lys Glu Asp Ala Arg Ala His
 210 215 220

 Glu Val Leu Leu Ala Ile Gln Ser Lys Ser Thr Leu Asp Asp Pro Gly
 225 230 235 240

 Ala Leu Ala Leu Pro Cys Glu Glu Phe Tyr Val Lys Thr Pro Glu Glu
 245 250 255

 Met Arg Ala Met Phe Pro Glu Glu Val Gly Gly Arg Ser Pro Leu
 260 265 270

 Thr Thr Pro Trp Arg Ser Pro His Val Gln Arg Gly Ala Ala Ile Gly
 275 280 285

 Thr Arg Trp Ser Thr Arg Ile Pro Arg Phe Pro Leu Pro Glu Gly Arg
 290 295 300

 Thr Glu Ala Gln Tyr Leu Met Glu Leu Thr Phe Lys Gly Leu Leu Arg
 305 310 315 320

 Arg Tyr Pro Asp Arg Ile Thr Glu Gly Phe Tyr Arg Glu Val Phe Arg
 325 330 335

 Leu Ser Gly Lys Leu Pro Pro His Gly Asp Gly Glu Ala Leu Ala Glu
 340 345 350

 Ala Leu Ala Gln Val Glu Arg Glu Ala Trp Glu Arg Leu Met Lys Ser
 355 360 365

 Leu Pro Pro Leu Ala Gly Val Lys Glu Trp Thr Ala Glu Ala Ile Phe
 370 375 380

 His Arg Ala Leu Tyr Glu Leu Ser Ala Ile Glu Arg Met Gly Phe Pro
 385 390 395 400

 Gly Leu Leu Pro His Arg Pro Gly Leu His Gln Leu Gly Pro Glu Lys
 405 410 415

 Gly Val Ser Val Gly Pro Gly Arg Gly Ala Ala Gly Ser Leu Val
 420 425 430

 Ala Tyr Ala Val Gly Ile Thr Asn Ile Asp Pro Leu Arg Phe Gly Leu
 435 440 445

 Leu Phe Glu Arg Phe Leu Asn Pro Glu Arg Val Ser Met Pro Asp Ile
 450 455 460

Asp Thr Asp Phe Ser Asp Arg Glu Arg Asp Arg Val Ile Gln Tyr Val
465 470 475 480

Arg Glu Arg Tyr Gly Glu Asp Lys Val Ala Gln Ile Gly Thr Leu Gly
485 490 495

Ser Leu Ala Ser Lys Ala Ala Leu Lys Glu Val Ala Arg Val Tyr Gly
500 505 510

Ile Pro Arg Lys Lys Ala Glu Glu Leu Ala Lys Leu Ile Pro Val Gln
515 520 525

Phe Gly Lys Pro Lys Pro Leu Gln Glu Ala Ile Gln Val Val Pro Glu
530 535 540

Leu Arg Ala Glu Met Glu Lys Asp Pro Lys Val Arg Glu Val Leu Glu
545 550 555 560

Val Ala Met Arg Leu Glu Gly Leu Asn Arg His Ala Ser Val His Ala
565 570 575

Gly Arg Gly Gly Val Phe Ser Glu Pro Leu Thr Asp Leu Val Pro Leu
580 585 590

Cys Ala Thr Arg Lys Gly Gly Pro Tyr Thr Gln Tyr Asp Met Gly Ala
595 600 605

Val Glu Ala Leu Gly Leu Leu Lys Met Asp Phe Leu Gly Leu Arg Thr
610 615 620

Leu Thr Phe Leu Asp Glu Val Lys Arg Ile Val Lys Ala Ser Gln Gly
625 630 635 640

Val Glu Leu Asp Tyr Asp Ala Leu Pro Leu Asp Asp Pro Lys Thr Phe
645 650 655

Ala Leu Leu Ser Arg Gly Glu Thr Lys Gly Val Phe Gln Leu Glu Ser
660 665 670

Gly Gly Met Thr Ala Thr Leu Arg Gly Leu Lys Pro Arg Arg Phe Glu
675 680 685

Asp Leu Ile Ala Ile Leu Ser Leu Tyr Arg Pro Gly Pro Met Glu His
690 695 700

Ile Pro Thr Tyr Ile Arg Arg His His Gly Leu Glu Pro Val Ser Tyr
705 710 715 720

Ser Glu Phe Pro His Ala Glu Lys Tyr Leu Lys Pro Ile Leu Asp Glu
 725 730 735

Thr Tyr Gly Ile Pro Val Tyr Gln Glu Gln Ile Met Gln Ile Ala Ser
 740 745 750

Ala Val Ala Gly Tyr Ser Leu Gly Glu Ala Asp Leu Leu Arg Arg Ser
 755 760 765

Met Gly Lys Lys Lys Val Glu Glu Met Lys Ser His Arg Glu Arg Phe
 770 775 780

Val Gln Gly Ala Lys Glu Arg Gly Val Pro Glu Glu Ala Asn Arg
 785 790 795 800

Leu Phe Asp Met Leu Glu Ala Phe Ala Asn Tyr Gly Phe Asn Lys Ser
 805 810 815

His Ala Ala Ala Tyr Ser Leu Leu Ser Tyr Gln Thr Ala Tyr Val Lys
 820 825 830

Ala His Tyr Pro Val Glu Phe Met Ala Ala Leu Leu Ser Val Glu Arg
 835 840 845

His Asp Ser Asp Lys Val Ala Glu Tyr Ile Arg Asp Ala Arg Ala Met
 850 855 860

Gly Ile Glu Val Leu Pro Pro Asp Val Asn Arg Ser Gly Phe Asp Phe
 865 870 875 880

Leu Val Gln Gly Arg Gln Ile Leu Phe Gly Leu Ser Ala Val Lys Asn
 885 890 895

Val Gly Glu Ala Ala Ala Glu Ala Ile Leu Arg Glu Arg Gly
 900 905 910

Gly Pro Tyr Arg Ser Leu Gly Asp Phe Leu Lys Arg Leu Asp Glu Lys
 915 920 925

Val Leu Asn Lys Arg Thr Leu Glu Ser Leu Ile Lys Ala Gly Ala Leu
 930 935 940

Asp Gly Phe Gly Glu Arg Ala Arg Leu Leu Ala Ser Leu Glu Gly Leu
 945 950 955 960

Leu Lys Trp Ala Ala Glu Asn Arg Glu Lys Ala Arg Ser Gly Met Met
 965 970 975

Gly Leu Phe Ser Glu Val Glu Glu Pro Pro Leu Ala Glu Ala Ala Pro
 980 985 990
 Leu Asp Glu Ile Thr Arg Leu Arg Tyr Glu Lys Glu Ala Leu Gly Ile
 995 1000 1005
 Tyr Val Ser Gly His Pro Ile Leu Arg Tyr Pro Gly Leu Arg Glu Thr
 1010 1015 1020
 Ala Thr Cys Thr Leu Glu Glu Leu Pro His Leu Ala Arg Asp Leu Pro
 1025 1030 1035 1040
 Pro Arg Ser Arg Val Leu Leu Ala Gly Met Val Glu Glu Val Val Arg
 1045 1050 1055
 Lys Pro Thr Lys Ser Gly Gly Met Met Ala Arg Phe Val Leu Ser Asp
 1060 1065 1070
 Glu Thr Gly Ala Leu Glu Ala Val Ala Phe Gly Arg Ala Tyr Asp Gln
 1075 1080 1085
 Val Ser Pro Arg Leu Lys Glu Asp Thr Pro Val Leu Val Leu Ala Glu
 1090 1095 1100
 Val Glu Arg Glu Glu Gly Gly Val Arg Val Leu Ala Gln Ala Val Trp
 1105 1110 1115 1120
 Thr Tyr Gln Glu Leu Glu Gln Val Pro Arg Ala Leu Glu Val Glu Val
 1125 1130 1135
 Glu Ala Ser Leu Pro Asp Asp Arg Gly Val Ala His Leu Lys Ser Leu
 1140 1145 1150
 Leu Asp Glu His Ala Gly Thr Leu Pro Leu Tyr Val Arg Val Gln Gly
 1155 1160 1165
 Ala Phe Gly Glu Ala Leu Leu Ala Leu Arg Glu Val Arg Val Gly Glu
 1170 1175 1180
 Glu Ala Leu Gly Ala Leu Glu Ala Ala Gly Phe Pro Ala Tyr Leu Leu
 1185 1190 1195 1200
 Pro Asn Arg Glu Val Ser Pro Arg Leu Thr Gly Ser Gly Gly Pro Arg
 1205 1210 1215
 Gly Arg Ala Leu Ser Thr Gly Leu Ala Leu Lys Thr Tyr Pro Ile Ala
 1220 1225 1230

Leu Pro Gly Gly Asn Glu Ala Leu Ala Arg Pro Leu Leu
1235 1240 1245

<210> 88
<211> 198
<212> PRT
<213> Thermus thermophilus

<400> 88
Val Glu Arg Val Val Arg Thr Leu Leu Asp Gly Arg Phe Leu Leu Glu
1 5 10 15

Glu Gly Val Gly Leu Trp Glu Trp Arg Tyr Pro Phe Pro Leu Glu Gly
20 25 30

Glu Ala Val Val Val Leu Asp Leu Glu Thr Thr Gly Leu Ala Gly Leu
35 40 45

Asp Glu Val Ile Glu Val Gly Leu Leu Arg Leu Glu Gly Arg Arg
50 55 60

Leu Pro Phe Gln Ser Leu Val Arg Pro Leu Pro Pro Ala Glu Ala Arg
65 70 75 80

Ser Trp Asn Leu Thr Gly Ile Pro Arg Glu Ala Leu Glu Glu Ala Pro
85 90 95

Ser Leu Glu Glu Val Leu Glu Lys Ala Tyr Pro Leu Arg Gly Asp Ala
100 105 110

Thr Leu Val Ile His Asn Ala Ala Phe Asp Leu Gly Phe Leu Arg Pro
115 120 125

Ala Leu Glu Gly Leu Gly Tyr Arg Leu Glu Asn Pro Val Val Asp Ser
130 135 140

Leu Arg Leu Ala Arg Arg Gly Leu Pro Gly Leu Arg Arg Tyr Gly Leu
145 150 155 160

Asp Ala Leu Ser Glu Val Leu Glu Leu Pro Arg Arg Thr Cys His Arg
165 170 175

Ala Leu Glu Asp Val Glu Arg Thr Leu Ala Val Val His Glu Val Tyr
180 185 190

Tyr Met Leu Thr Ser Gly
195

<210> 89
 <211> 182
 <212> PRT
 <213> Deinococcus radiodurans

<220>
 <221> PEPTIDE
 <222> (79)
 <223> X at position 79 is undefined

<400> 89
 Pro Trp Pro Gln Asp Val Val Val Phe Asp Leu Glu Thr Thr Gly Phe
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Ser Pro Ala Ser Ala Ala Ile Val Glu Ile Gly Ala Val Arg Ile Val
 20 25 30

Gly Gly Gln Ile Asp Glu Thr Leu Lys Phe Glu Thr Leu Val Arg Pro
 35 40 45

Thr Arg Pro Asp Gly Ser Met Leu Ser Ile Pro Trp Gln Ala Gln Arg
 50 55 60

Val His Gly Ile Ser Asp Glu Met Val Arg Arg Ala Pro Ala Xaa Lys
 65 70 75 80

Asp Val Leu Pro Asp Phe Phe Asp Phe Val Asp Gly Ser Ala Val Val
 85 90 95

Ala His Asn Val Ser Phe Asp Gly Gly Phe Met Arg Ala Gly Ala Glu
 100 105 110

Arg Leu Gly Leu Ser Trp Ala Pro Glu Arg Glu Leu Cys Thr Met Gln
 115 120 125

Leu Ser Arg Arg Ala Phe Pro Arg Glu Arg Thr His Asn Leu Thr Val
 130 135 140

Leu Ala Glu Arg Leu Gly Leu Glu Phe Ala Pro Gly Gly Arg His Arg
 145 150 155 160

Ser Tyr Gly Asp Val Gln Val Thr Ala Gln Ala Tyr Leu Arg Leu Leu
 165 170 175

Glu Leu Leu Gly Glu Arg
 180

<210> 90
 <211> 201
 <212> PRT
 <213> Bacillus subtilis

<400> 90
 His Gly Ile Lys Met Ile Tyr Gly Met Glu Ala Asn Leu Val Asp Asp
 1 5 10 15

Gly Val Pro Ile Ala Tyr Asn Ala Ala His Arg Leu Leu Glu Glu Glu
 20 25 30

Thr Tyr Val Val Phe Asp Val Glu Thr Thr Gly Leu Ser Ala Val Tyr
 35 40 45

Asp Thr Ile Ile Glu Leu Ala Ala Val Lys Val Lys Gly Gly Glu Ile
 50 55 60

Ile Asp Lys Phe Glu Ala Phe Ala Asn Pro His Arg Pro Leu Ser Ala
 65 70 75 80

Thr Ile Ile Glu Leu Thr Gly Ile Thr Asp Asp Met Leu Gln Asp Ala
 85 90 95

Pro Asp Val Val Asp Val Ile Arg Asp Phe Arg Glu Trp Ile Gly Asp
 100 105 110

Asp Ile Leu Val Ala His Asn Ala Ser Phe Asp Met Gly Phe Leu Asn
 115 120 125

Val Ala Tyr Lys Lys Leu Leu Glu Val Glu Lys Ala Lys Asn Pro Val
 130 135 140

Ile Asp Thr Leu Glu Leu Gly Arg Phe Leu Tyr Pro Glu Phe Lys Asn
 145 150 155 160

His Arg Leu Asn Thr Leu Cys Lys Lys Phe Asp Ile Glu Leu Thr Gln
 165 170 175

His His Arg Ala Ile Tyr Asp Thr Glu Ala Thr Ala Tyr Leu Leu Leu
 180 185 190

Lys Met Leu Lys Asp Ala Ala Glu Lys
 195 200

<210> 91
<211> 188
<212> PRT
<213> Haemophilus influenzae

<220>
<221> PEPTIDE
<222> (47)
<223> X at position 47 is undefined

<220>
<221> PEPTIDE
<222> (57)
<223> X at position 57 is undefined

<400> 91
Met Ile Asn Pro Asn Arg Gln Ile Val Leu Asp Thr Glu Thr Thr Gly
1 5 10 15

Met Asn Gln Leu Gly Ala His Tyr Glu Gly His Cys Ile Ile Glu Ile
20 25 30

Gly Ala Val Glu Leu Ile Asn Arg Arg Tyr Thr Gly Asn Asn Xaa His
35 40 45

Ile Tyr Ile Lys Pro Asp Arg Pro Xaa Asp Pro Asp Ala Ile Lys Val
50 55 60

His Gly Ile Thr Asp Glu Met Leu Ala Asp Lys Pro Glu Phe Lys Glu
65 70 75 80

Val Ala Gln Asp Phe Leu Asp Tyr Ile Asn Gly Ala Glu Leu Leu Ile
85 90 95

His Asn Ala Pro Phe Asp Val Gly Phe Met Asp Tyr Glu Phe Arg Lys
100 105 110

Leu Asn Leu Asn Val Lys Thr Asp Asp Ile Cys Leu Val Thr Asp Thr
115 120 125

Leu Gln Met Ala Arg Gln Met Tyr Pro Gly Lys Arg Asn Asn Leu Asp
130 135 140

Ala Leu Cys Asp Arg Leu Gly Ile Asp Asn Ser Lys Arg Thr Leu His
145 150 155 160

Gly Ala Leu Leu Asp Ala Glu Ile Leu Ala Asp Val Tyr Leu Met Met
165 170 175

Thr Gly Gly Gln Thr Asn Leu Phe Asp Glu Glu Glu
 180 185

<210> 92
 <211> 189
 <212> PRT
 <213> Escherichia coli

<400> 92

Met	Ser	Thr	Ala	Ile	Thr	Arg	Gln	Ile	Val	Leu	Asp	Thr	Glu	Thr	Thr
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Gly Met Asn Gln Ile Gly Ala His Ser Glu Gly His Lys Ile Ile Glu
 20 25 30

Ile Gly Ala Val Glu Val Val Asn Arg Arg Leu Thr Gly Asn Asn Phe
 35 40 45

His Val Tyr Leu Lys Asp Arg Leu Val Asp Pro Glu Ala Phe Gly Val
 50 55 60

His Gly Ile Ala Val Asp Phe Leu Leu Asp Lys Pro Thr Phe Ala Glu
 65 70 80

Val Ala Val Glu Phe Met Asp Tyr Ile Arg Gly Ala Glu Leu Val Ile
 85 90 95

His Asn Ala Ala Phe Asp Ile Gly Phe Met Asp Tyr Glu Phe Ser Leu
 100 105 110

Leu Lys Arg Asp Ile Ala Lys Thr Asn Thr Phe Cys Lys Val Thr Asp
 115 120 125

Ser Leu Ala Val Ala Arg Lys Met Phe Pro Gly Lys Arg Asn Ser Leu
 130 135 140

Asp Ala Leu Cys Ala Arg Tyr Glu Ile Asp Asn Ser Lys Arg Thr Leu
 145 150 155 160

His Gly Ala Leu Leu Asp Ala Gln Ile Leu Ala Glu Val Tyr Leu Ala
 165 170 175

Met Thr Gly Gly Gln Thr Ser Met Ala Phe Ala Met Glu
 180 185

<210> 93
<211> 201
<212> PRT
<213> Helicobacter pylori

<400> 93

Asn	Leu	Glu	Tyr	Leu	Lys	Ala	Cys	Gly	Leu	Asn	Phe	Ile	Glu	Thr	Ser
1		5				10					15				

Glu Asn Leu Ile Thr Leu Lys Asn Leu Lys Thr Pro Leu Lys Asp Glu
20 25 30

Val Phe Ser Phe Ile Asp Leu Glu Thr Thr Gly Ser Cys Pro Ile Lys
35 40 45

His Glu Ile Leu Glu Ile Gly Ala Val Gln Val Lys Gly Gly Glu Ile
50 55 60

Ile Asn Arg Phe Glu Thr Leu Val Lys Val Lys Ser Val Pro Asp Tyr
65 70 75 80

Ile Ala Glu Leu Thr Gly Ile Thr Tyr Glu Asp Thr Leu Asn Ala Pro
85 90 95

Ser Ala His Glu Ala Leu Gln Glu Leu Arg Leu Phe Leu Gly Asn Ser
100 105 110

Val Phe Val Ala His Asn Ala Asn Phe Asp Tyr Asn Phe Leu Gly Arg
115 120 125

Tyr Phe Val Glu Lys Leu His Cys Pro Leu Leu Asn Leu Lys Leu Cys
130 135 140

Thr Leu Asp Leu Ser Lys Arg Ala Ile Leu Ser Met Arg Tyr Ser Leu
145 150 155 160

Ser Phe Leu Lys Glu Leu Leu Gly Phe Gly Ile Glu Val Ser His Arg
165 170 175

Ala Tyr Ala Asp Ala Leu Ala Ser Tyr Lys Leu Phe Glu Ile Cys Leu
180 185 190

Leu Asn Leu Pro Ser Tyr Ile Lys Thr
195 200

<210> 94
<211> 630

<212> DNA

<213> Thermus thermophilus

<400> 94

atgggtggagc ggggtggtgcg gacccttctg gacgggaggt tcctccttggaa ggagggggtg 60
gggccttggg agtggcgcta cccctttccc ctggaggggg aggccgttgtt ggtcctggac 120
ctggagacca cggggcttgc cggcctggac gaggtgattt aggtgggcct cctccgcctg 180
gagggggggga ggcgcctccc cttccagagc ctcgtccggc ccctcccgcc cgccgaagcc 240
cgttcgttggaa acctcaccgg catccccccg gaggccctgg aggaggcccc ctccctggag 300
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cccggttgtgg actccctgcg cttggccaga cggggcttac caggccttag gcgtacggc 480
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gacgtggagc gcaccctcgc cgtggtgcac gaggtataact atatgcttac gtccggccgt 600
ccccgcacgc tttgggaact cgggaggttag 630

<210> 95

<211> 210

<212> PRT

<213> Thermus thermophilus

<400> 95

Met Val Glu Arg Val Val Arg Thr Leu Leu Asp Gly Arg Phe Leu Leu
1 5 10 15

Glu Glu Gly Val Gly Leu Trp Glu Trp Arg Tyr Pro Phe Pro Leu Glu
20 25 30

Gly Glu Ala Val Val Val Leu Asp Leu Glu Thr Thr Gly Leu Ala Gly
35 40 45

Leu Asp Glu Val Ile Glu Val Gly Leu Leu Arg Leu Glu Gly Gly Arg
50 55 60

Arg Leu Pro Phe Gln Ser Leu Val Arg Pro Leu Pro Pro Ala Glu Ala
65 70 75 80

Arg Ser Trp Asn Leu Thr Gly Ile Pro Arg Glu Ala Leu Glu Glu Ala
85 90 95

Pro Ser Leu Glu Glu Val Leu Glu Lys Ala Tyr Pro Leu Arg Gly Asp
100 105 110

Ala Thr Leu Val Ile His Asn Ala Ala Phe Asp Leu Gly Phe Leu Arg
115 120 125

Pro Ala Leu Glu Gly Leu Gly Tyr Arg Leu Glu Asn Pro Val Val Asp

130	135	140
Ser Leu Arg Leu Ala Arg Arg Gly Leu Pro Gly Leu Arg Arg Tyr Gly		
145	150	155
Leu Asp Ala Leu Ser Glu Val Leu Glu Leu Pro Arg Arg Thr Cys His		
165	170	175
Arg Ala Leu Glu Asp Val Glu Arg Thr Leu Ala Val Val His Glu Val		
180	185	190
Tyr Tyr Met Leu Thr Ser Gly Arg Pro Arg Thr Leu Trp Glu Leu Gly		
195	200	205
Arg Glx		
210		
<210> 96		
<211> 461		
<212> PRT		
<213> Pseudomonas marcesans		
<400> 96		
Met Leu Glu Ala Ser Trp Glu Lys Val Gln Ser Ser Leu Lys Gln Asn		
1	5	10
		15
Leu Ser Lys Pro Ser Tyr Glu Thr Trp Ile Arg Pro Thr Glu Phe Ser		
20	25	30
Gly Phe Lys Asn Gly Glu Leu Thr Leu Ile Ala Pro Asn Ser Phe Ser		
35	40	45
Ser Ala Trp Leu Lys Asn Asn Tyr Ser Gln Thr Ile Gln Glu Thr Ala		
50	55	60
Glu Glu Ile Phe Gly Glu Pro Val Thr Val His Val Lys Val Lys Ala		
65	70	75
		80
Asn Ala Glu Ser Ser Asp Glu His Tyr Ser Ser Ala Pro Ile Thr Pro		
85	90	95
Pro Leu Glu Ala Ser Pro Gly Ser Val Asp Ser Ser Gly Ser Ser Leu		
100	105	110
Arg Leu Ser Lys Lys Thr Leu Pro Leu Leu Asn Leu Arg Tyr Val Phe		
115	120	125

Asn	Arg	Phe	Val	Val	Gly	Pro	Asn	Ser	Arg	Met	Ala	His	Ala	Ala	Ala
130							135					140			
Met	Ala	Val	Ala	Glu	Ser	Pro	Gly	Arg	Glu	Phe	Asn	Pro	Leu	Phe	Ile
145							150					155			160
Cys	Gly	Gly	Val	Gly	Leu	Gly	Lys	Thr	His	Leu	Met	Gln	Ala	Ile	Gly
							165					170	.		175
His	Tyr	Arg	Leu	Glu	Ile	Asp	Pro	Gly	Ala	Lys	Val	Ser	Tyr	Val	Ser
							180					185			190
Thr	Glu	Thr	Phe	Thr	Asn	Asp	Leu	Ile	Leu	Ala	Ile	Arg	Gln	Asp	Arg
							195					200			205
Met	Gln	Ala	Phe	Arg	Asp	Arg	Tyr	Arg	Ala	Ala	Asp	Leu	Ile	Leu	Val
							210					215			220
Asp	Asp	Ile	Gln	Phe	Ile	Glu	Gly	Lys	Glu	Tyr	Thr	Gln	Glu	Glu	Phe
							225					230			240
Phe	His	Thr	Phe	Asn	Ala	Leu	His	Asp	Ala	Gly	Ser	Gln	Ile	Val	Leu
							245					250			255
Ala	Ser	Asp	Arg	Pro	Pro	Ser	Gln	Ile	Pro	Arg	Leu	Gln	Glu	Arg	Leu
							260					265			270
Met	Ser	Arg	Phe	Ser	Met	Gly	Leu	Ile	Ala	Asp	Val	Gln	Ala	Pro	Asp
							275					280			285
Leu	Glu	Thr	Arg	Met	Ala	Ile	Leu	Gln	Lys	Lys	Ala	Glu	His	Glu	Arg
							290					295			300
Val	Gly	Leu	Pro	Arg	Asp	Leu	Ile	Gln	Phe	Ile	Ala	Gly	Arg	Phe	Thr
							305					310			320
Ser	Asn	Ile	Arg	Glu	Leu	Glu	Gly	Ala	Leu	Thr	Arg	Ala	Ile	Ala	Phe
							325					330			335
Ala	Ser	Ile	Thr	Gly	Leu	Pro	Met	Thr	Val	Asp	Ser	Ile	Ala	Pro	Met
							340					345			350
Leu	Asp	Pro	Asn	Gly	Gln	Gly	Val	Glu	Val	Thr	Pro	Lys	Gln	Val	Leu
							355					360			365
Asp	Lys	Val	Ala	Glu	Val	Phe	Lys	Val	Thr	Pro	Asp	Glu	Met	Arg	Ser
							370					375			380

Ala Ser Arg Arg Arg Pro Val Ser Gln Ala Arg Gln Val Gly Met Tyr
385 390 395 400

Leu Met Arg Gln Gly Thr Asn Leu Ser Leu Pro Arg Ile Gly Asp Thr
405 410 415

Phe Gly Gly Lys Asp His Thr Thr Val Met Tyr Ala Ile Glu Gln Val
420 425 430

Glu Lys Lys Leu Ser Ser Asp Pro Gln Ile Ala Ser Gln Val Gln Lys
435 440 445

Ile Arg Asp Leu Leu Gln Ile Asp Ser Arg Arg Lys Arg
450 455 460

<210> 97

<211> 447

<212> PRT

<213> Synechocystis sp.

<400> 97

Met Val Ser Cys Glu Asn Leu Trp Gln Gln Ala Leu Ala Ile Leu Ala
1 5 10 15

Thr Gln Leu Thr Lys Pro Ala Phe Asp Thr Trp Ile Lys Ala Ser Val
20 25 30

Leu Ile Ser Leu Gly Asp Gly Val Ala Thr Ile Gln Val Glu Asn Gly
35 40 45

Phe Val Leu Asn His Leu Gln Lys Ser Tyr Gly Pro Leu Leu Met Glu
50 55 60

Val Leu Thr Asp Leu Thr Gly Gln Glu Ile Thr Val Lys Leu Ile Thr
65 70 75 80

Asp Gly Leu Glu Pro His Ser Leu Ile Gly Gln Glu Ser Ser Leu Pro
85 90 95

Met Glu Thr Thr Pro Lys Asn Ala Thr Ala Leu Asn Gly Lys Tyr Thr
100 105 110

Phe Ser Arg Phe Val Val Gly Pro Thr Asn Arg Met Ala His Ala Ala
115 120 125

Ser Leu Ala Val Ala Glu Ser Pro Gly Arg Glu Phe Asn Pro Leu Phe
130 135 140

Leu Cys Gly Gly Val Gly Leu Gly Lys Thr His Leu Met Gln Ala Ile
145 150 155 160

Ala His Tyr Arg Leu Glu Met Tyr Pro Asn Ala Lys Val Tyr Tyr Val
165 170 175

Ser Thr Glu Arg Phe Thr Asn Asp Leu Ile Thr Ala Ile Arg Gln Asp
180 185 190

Asn Met Glu Asp Phe Arg Ser Tyr Tyr Arg Ser Ala Asp Phe Leu Leu
195 200 205

Ile Asp Asp Ile Gln Phe Ile Lys Gly Lys Glu Tyr Thr Gln Glu Glu
210 215 220

Phe Phe His Thr Phe Asn Ser Leu His Glu Ala Gly Lys Gln Val Val
225 230 235 240

Val Ala Ser Asp Arg Ala Pro Gln Arg Ile Pro Gly Leu Gln Asp Arg
245 250 255

Leu Ile Ser Arg Phe Ser Met Gly Leu Ile Ala Asp Ile Gln Val Pro
260 265 270

Asp Leu Glu Thr Arg Met Ala Ile Leu Gln Lys Lys Ala Glu Tyr Asp
275 280 285

Arg Ile Arg Leu Pro Lys Glu Val Ile Glu Tyr Ile Ala Ser His Tyr
290 295 300

Thr Ser Asn Ile Arg Glu Leu Glu Gly Ala Leu Ile Arg Ala Ile Ala
305 310 315 320

Tyr Thr Ser Leu Ser Asn Val Ala Met Thr Val Glu Asn Ile Ala Pro
325 330 335

Val Leu Asn Pro Pro Val Glu Lys Val Ala Ala Ala Pro Glu Thr Ile
340 345 350

Ile Thr Ile Val Ala Gln His Tyr Gln Leu Lys Val Glu Glu Leu Leu
355 360 365

Ser Asn Ser Arg Arg Arg Glu Val Ser Leu Ala Arg Gln Val Gly Met
370 375 380

Tyr Leu Met Arg Gln His Thr Asp Leu Ser Leu Pro Arg Ile Gly Glu
385 390 395 400

Ala Phe Gly Gly Lys Asp His Thr Thr Val Met Tyr Ser Cys Asp Lys			
405	410	415	
Ile Thr Gln Leu Gln Gln Lys Asp Trp Glu Thr Ser Gln Thr Leu Thr			
420	425	430	
Ser Leu Ser His Arg Ile Asn Ile Ala Gly Gln Ala Pro Glu Ser			
435	440	445	
<210> 98			
<211> 446			
<212> PRT			
<213> Bacillus subtilis			
<400> 98			
Met Glu Asn Ile Leu Asp Leu Trp Asn Gln Ala Leu Ala Gln Ile Glu			
1	5	10	15
Lys Lys Leu Ser Lys Pro Ser Phe Glu Thr Trp Met Lys Ser Thr Lys			
20	25	30	
Ala His Ser Leu Gln Gly Asp Thr Leu Thr Ile Thr Ala Pro Asn Glu			
35	40	45	
Phe Ala Arg Asp Trp Leu Glu Ser Arg Tyr Leu His Leu Ile Ala Asp			
50	55	60	
Thr Ile Tyr Glu Leu Thr Gly Glu Glu Leu Ser Ile Lys Phe Val Ile			
65	70	75	80
Pro Gln Asn Gln Asp Val Glu Asp Phe Met Pro Lys Pro Gln Val Lys			
85	90	95	
Lys Ala Val Lys Glu Asp Thr Ser Asp Phe Pro Gln Asn Met Leu Asn			
100	105	110	
Pro Lys Tyr Thr Phe Asp Thr Phe Val Ile Gly Ser Gly Asn Arg Phe			
115	120	125	
Ala His Ala Ala Ser Leu Ala Val Ala Glu Ala Pro Ala Lys Ala Tyr			
130	135	140	
Asn Pro Leu Phe Ile Tyr Gly Val Gly Leu Gly Lys Thr His Leu			
145	150	155	160
Met His Ala Ile Gly His Tyr Val Ile Asp His Asn Pro Ser Ala Lys			

165	170	175
Val Val Tyr Leu Ser Ser Glu Lys Phe Thr Asn Glu Phe Ile Asn Ser		
180	185	190
Ile Arg Asp Asn Lys Ala Val Asp Phe Arg Asn Arg Tyr Arg Asn Val		
195	200	205
Asp Val Leu Leu Ile Asp Asp Ile Gln Phe Leu Ala Gly Lys Glu Gln		
210	215	220
Thr Gln Glu Glu Phe Phe His Thr Phe Asn Thr Leu His Glu Glu Ser		
225	230	235
Lys Gln Ile Val Ile Ser Ser Asp Arg Pro Pro Lys Glu Ile Pro Thr		
245	250	255
Leu Glu Asp Arg Leu Arg Ser Arg Phe Glu Trp Gly Leu Ile Thr Asp		
260	265	270
Ile Thr Pro Pro Asp Leu Glu Thr Arg Ile Ala Ile Leu Arg Lys Lys		
275	280	285
Ala Lys Ala Glu Gly Leu Asp Ile Pro Asn Glu Val Met Leu Tyr Ile		
290	295	300
Ala Asn Gln Ile Asp Ser Asn Ile Arg Glu Leu Glu Gly Ala Leu Ile		
305	310	315
Arg Val Val Ala Tyr Ser Ser Leu Ile Asn Lys Asp Ile Asn Ala Asp		
325	330	335
Leu Ala Ala Glu Ala Leu Lys Asp Ile Ile Pro Ser Ser Lys Pro Lys		
340	345	350
Val Ile Thr Ile Lys Glu Ile Gln Arg Val Val Gly Gln Gln Phe Asn		
355	360	365
Ile Lys Leu Glu Asp Phe Lys Ala Lys Lys Arg Thr Lys Ser Val Ala		
370	375	380
Phe Pro Arg Gln Ile Ala Met Tyr Leu Ser Arg Glu Met Thr Asp Ser		
385	390	395
Ser Leu Pro Lys Ile Gly Glu Glu Phe Gly Gly Arg Asp His Thr Thr		
405	410	415
Val Ile His Ala His Glu Lys Ile Ser Lys Leu Leu Ala Asp Asp Glu		

420 425 430

Gln Leu Gln Gln His Val Lys Glu Ile Lys Glu Gln Leu Lys
435 440 445

<210> 99
<211> 507
<212> PRT
<213> Mycobacterium tuberculosis

<400> 99

Met Thr Asp Asp Pro Gly Ser Gly Phe Thr Thr Val Trp Asn Ala Val
1 5 10 15

Val Ser Glu Leu Asn Gly Asp Pro Lys Val Asp Asp Gly Pro Ser Ser
20 25 30

Asp Ala Asn Leu Ser Ala Pro Leu Thr Pro Gln Gln Arg Ala Trp Leu
35 40 45

Asn Leu Val Gln Pro Leu Thr Ile Val Glu Gly Phe Ala Leu Leu Ser
50 55 60

Val Pro Ser Ser Phe Val Gln Asn Glu Ile Glu Arg His Leu Arg Ala
65 70 75 80

Pro Ile Thr Asp Ala Leu Ser Arg Arg Leu Gly His Gln Ile Gln Leu
85 90 95

Gly Val Arg Ile Ala Pro Pro Ala Thr Asp Glu Ala Asp Asp Thr Thr
100 105 110

Val Pro Pro Ser Glu Asn Pro Ala Thr Thr Ser Pro Asp Thr Thr Thr
115 120 125

Asp Asn Asp Glu Ile Asp Asp Ser Ala Ala Ala Arg Gly Asp Asn Gln
130 135 140

His Ser Trp Pro Ser Tyr Phe Thr Glu Arg Pro His Asn Thr Asp Ser
145 150 155 160

Ala Thr Ala Gly Val Thr Ser Leu Asn Arg Arg Tyr Thr Phe Asp Thr
165 170 175

Phe Val Ile Gly Ala Ser Asn Arg Phe Ala His Ala Ala Leu Ala
180 185 190

Ile	Ala	Glu	Ala	Pro	Ala	Arg	Ala	Tyr	Asn	Pro	Leu	Phe	Ile	Trp	Gly
195															205
Glu	Ser	Gly	Leu	Gly	Lys	Thr	His	Leu	Leu	His	Ala	Ala	Gly	Asn	Tyr
210															220
Ala	Gln	Arg	Leu	Phe	Pro	Gly	Met	Arg	Val	Lys	Tyr	Val	Ser	Thr	Glu
225															240
Glu	Phe	Thr	Asn	Asp	Phe	Ile	Asn	Ser	Leu	Arg	Asp	Asp	Arg	Lys	Val
245															255
Ala	Phe	Lys	Arg	Ser	Tyr	Arg	Asp	Val	Asp	Val	Leu	Leu	Val	Asp	Asp
260															270
Ile	Gln	Phe	Ile	Glu	Gly	Lys	Glu	Gly	Ile	Gln	Glu	Glu	Phe	Phe	His
275															285
Thr	Phe	Asn	Thr	Leu	His	Asn	Ala	Asn	Lys	Gln	Ile	Val	Ile	Ser	Ser
290															300
Asp	Arg	Pro	Pro	Lys	Gln	Leu	Ala	Thr	Leu	Glu	Asp	Arg	Leu	Arg	Thr
305															320
Arg	Phe	Glu	Trp	Gly	Leu	Ile	Thr	Asp	Val	Gln	Pro	Pro	Glu	Leu	Glu
325															335
Thr	Arg	Ile	Ala	Ile	Leu	Arg	Lys	Lys	Ala	Gln	Met	Glu	Arg	Leu	Ala
340															350
Val	Pro	Asp	Asp	Val	Leu	Glu	Leu	Ile	Ala	Ser	Ser	Ile	Glu	Arg	Asn
355															365
Ile	Arg	Glu	Leu	Glu	Gly	Ala	Leu	Ile	Arg	Val	Thr	Ala	Phe	Ala	Ser
370															380
Leu	Asn	Lys	Thr	Pro	Ile	Asp	Lys	Ala	Leu	Glu	Ile	Val	Leu	Arg	
385															400
Asp	Leu	Ile	Ala	Asp	Ala	Asn	Thr	Met	Gln	Ile	Ser	Ala	Ala	Thr	Ile
405															415
Met	Ala	Ala	Thr	Ala	Glu	Tyr	Phe	Asp	Thr	Thr	Val	Glu	Glu	Leu	Arg
420															430
Gly	Pro	Gly	Lys	Thr	Arg	Ala	Leu	Ala	Gln	Ser	Arg	Gln	Ile	Ala	Met
435															445

Tyr Leu Cys Arg Glu Leu Thr Asp Leu Ser Leu Pro Lys Ile Gly Gln
450 455 460

Ala Phe Gly Arg Asp His Thr Thr Val Met Tyr Ala Gln Arg Lys Ile
465 470 475 480

Leu Ser Glu Met Ala Glu Arg Arg Glu Val Phe Asp His Val Lys Glu
485 490 495

Leu Thr Thr Arg Ile Arg Gln Arg Ser Lys Arg
500 505

<210> 100

<211> 446

<212> PRT

<213> Thermus thermophilus

<400> 100

Met Ser His Glu Ala Val Trp Gln His Val Leu Glu His Ile Arg Arg
1 5 10 15

Ser Ile Thr Glu Val Glu Phe His Thr Trp Phe Glu Arg Ile Arg Pro
20 25 30

Leu Gly Ile Arg Asp Gly Val Leu Glu Leu Ala Val Pro Thr Ser Phe
35 40 45

Ala Leu Asp Trp Ile Arg Arg His Tyr Ala Gly Leu Ile Gln Glu Gly
50 55 60

Pro Arg Leu Leu Gly Ala Gln Ala Pro Arg Phe Glu Leu Arg Val Val
65 70 75 80

Pro Gly Val Val Gln Glu Asp Ile Phe Gln Pro Pro Pro Ser Pro
85 90 95

Pro Ala Gln Ala Gln Pro Glu Asp Thr Phe Lys Thr Ser Trp Trp Gly
100 105 110

Pro Thr Thr Pro Trp Pro His Gly Gly Ala Val Ala Val Ala Glu Ser
115 120 125

Pro Gly Arg Ala Tyr Asn Pro Leu Phe Ile Tyr Gly Gly Arg Gly Leu
130 135 140

Gly Lys Thr Tyr Leu Met His Ala Val Gly Pro Leu Arg Ala Lys Arg
145 150 155 160

Phe Pro His Met Arg Leu Glu Tyr Val Ser Thr Glu Thr Phe Thr Asn
165 170 175

Glu Leu Ile Asn Arg Pro Ser Ala Arg Asp Arg Met Thr Glu Phe Arg
180 185 190

Glu Arg Tyr Arg Ser Val Asp Leu Leu Leu Val Asp Asp Val Gln Phe
195 200 205

Ile Ala Gly Lys Glu Arg Thr Gln Glu Glu Phe Phe His Thr Phe Asn
210 215 220

Ala Leu Tyr Glu Ala His Lys Gln Ile Ile Leu Ser Ser Asp Arg Pro
225 230 235 240

Pro Lys Asp Ile Leu Thr Leu Glu Ala Arg Leu Arg Ser Arg Phe Glu
245 250 255

Trp Gly Leu Ile Thr Asp Asn Pro Ala Pro Asp Leu Glu Thr Arg Ile
260 265 270

Ala Ile Leu Lys Met Asn Ala Ser Ser Gly Pro Glu Asp Pro Glu Asp
275 280 285

Ala Leu Glu Tyr Ile Ala Arg Gln Val Thr Ser Asn Ile Arg Glu Trp
290 295 300

Glu Gly Ala Leu Met Arg Ala Ser Pro Phe Ala Ser Leu Asn Gly Val
305 310 315 320

Glu Leu Thr Arg Ala Val Ala Lys Ala Leu Arg His Leu Arg Pro
325 330 335

Arg Glu Leu Glu Ala Asp Pro Leu Glu Ile Ile Arg Lys Ala Ala Gly
340 345 350

Pro Val Arg Pro Glu Thr Pro Gly Gly Ala His Gly Glu Arg Arg Lys
355 360 365

Lys Glu Val Val Leu Pro Arg Gln Leu Ala Met Tyr Leu Val Arg Glu
370 375 380

Leu Thr Pro Ala Ser Leu Pro Glu Ile Gly Gln Leu Phe Gly Gly Arg
385 390 395 400

Asp His Thr Thr Val Arg Tyr Ala Ile Gln Lys Val Gln Glu Leu Ala
405 410 415

Gly	Lys	Pro	Asp	Arg	Glu	Val	Gln	Gly	Leu	Leu	Arg	Thr	Leu	Arg	Glu
420							425							430	
Ala	Cys	Thr	Asp	Pro	Val	Asp	Asn	Leu	Trp	Ile	Thr	Cys	Gly		
435						440								445	
<210> 101															
<211> 467															
<212> PRT															
<213> Escherichia coli															
<400> 101															
Met	Ser	Leu	Ser	Leu	Trp	Gln	Gln	Cys	Leu	Ala	Arg	Leu	Gln	Asp	Glu
1				5					10					15	
Leu	Pro	Ala	Thr	Glu	Phe	Ser	Met	Trp	Ile	Arg	Pro	Leu	Gln	Ala	Glu
20						25								30	
Leu	Ser	Asp	Asn	Thr	Leu	Ala	Leu	Tyr	Ala	Pro	Asn	Arg	Phe	Val	Leu
35						40								45	
Asp	Trp	Val	Arg	Asp	Lys	Tyr	Leu	Asn	Asn	Ile	Asn	Gly	Leu	Leu	Thr
50						55								60	
Ser	Phe	Cys	Gly	Ala	Asp	Ala	Pro	Gln	Leu	Arg	Phe	Glu	Val	Gly	Thr
65						70								80	
Lys	Pro	Val	Thr	Gln	Thr	Pro	Gln	Ala	Ala	Val	Thr	Ser	Asn	Val	Ala
85							90							95	
Ala	Pro	Ala	Gln	Val	Ala	Gln	Thr	Gln	Pro	Gln	Arg	Ala	Ala	Pro	Ser
100							105							110	
Thr	Arg	Ser	Gly	Trp	Asp	Asn	Val	Pro	Ala	Pro	Ala	Glu	Pro	Thr	Tyr
115							120							125	
Arg	Ser	Asn	Val	Asn	Val	Lys	His	Thr	Phe	Asp	Asn	Phe	Val	Glu	Gly
130							135							140	
Lys	Ser	Asn	Gln	Leu	Ala	Arg	Ala	Ala	Ala	Arg	Gln	Val	Ala	Asp	Asn
145								150						160	
Pro	Gly	Gly	Ala	Tyr	Asn	Pro	Leu	Phe	Leu	Tyr	Gly	Gly	Thr	Gly	Leu
165								170						175	
Gly	Lys	Thr	His	Leu	Leu	His	Ala	Val	Gly	Asn	Gly	Ile	Met	Ala	Arg

180	185	190
Lys Pro Asn Ala Lys Val Val Tyr Met His Ser Glu Arg Phe Val Gln		
195	200	205
Asp Met Val Lys Ala Leu Gln Asn Asn Ala Ile Glu Glu Phe Lys Arg		
210	215	220
Tyr Tyr Arg Ser Val Asp Ala Leu Leu Ile Asp Asp Ile Gln Phe Phe		
225	230	235
Ala Asn Lys Glu Arg Ser Gln Glu Glu Phe Phe His Thr Phe Asn Ala		
245	250	255
Leu Leu Glu Gly Asn Gln Gln Ile Ile Leu Thr Ser Asp Arg Tyr Pro		
260	265	270
Lys Glu Ile Asn Gly Val Glu Asp Arg Leu Lys Ser Arg Phe Gly Trp		
275	280	285
Gly Leu Thr Val Ala Ile Glu Pro Pro Glu Leu Glu Thr Arg Val Ala		
290	295	300
Ile Leu Met Lys Lys Ala Asp Glu Asn Asp Ile Arg Leu Pro Gly Glu		
305	310	315
Val Ala Phe Phe Ile Ala Lys Arg Leu Arg Ser Asn Val Arg Glu Leu		
325	330	335
Glu Gly Ala Leu Asn Arg Val Ile Ala Asn Ala Asn Phe Thr Gly Arg		
340	345	350
Ala Ile Thr Ile Asp Phe Val Arg Glu Ala Leu Arg Asp Leu Leu Ala		
355	360	365
Leu Gln Glu Lys Leu Val Thr Ile Asp Asn Ile Gln Lys Thr Val Ala		
370	375	380
Glu Tyr Tyr Lys Ile Lys Val Ala Asp Leu Leu Ser Lys Arg Arg Ser		
385	390	395
Arg Ser Val Ala Arg Pro Arg Gln Met Ala Met Ala Leu Ala Lys Glu		
405	410	415
Leu Thr Asn His Ser Leu Pro Glu Ile Gly Asp Ala Phe Gly Gly Arg		
420	425	430
Asp His Thr Thr Val Leu His Ala Cys Arg Lys Ile Glu Gln Leu Arg		

435

440

445

Glu Glu Ser His Asp Ile Lys Glu Asp Phe Ser Asn Leu Ile Arg Thr
 450 455 460

Leu Ser Ser
 465

<210> 102
<211> 440
<212> PRT
<213> Thermatoga maritima

<400> 102
Met Lys Glu Arg Ile Leu Gln Glu Ile Lys Thr Arg Val Asn Arg Lys
 1 5 10 15

Ser Trp Glu Leu Trp Phe Ser Ser Phe Asp Val Lys Ser Ile Glu Gly
 20 25 30

Asn Lys Val Val Phe Ser Val Gly Asn Leu Phe Ile Lys Glu Trp Leu
 35 40 45

Glu Lys Lys Tyr Tyr Ser Val Leu Ser Lys Ala Val Lys Val Val Leu
 50 55 60

Gly Asn Asp Ala Thr Phe Glu Ile Thr Tyr Glu Ala Phe Glu Pro His
 65 70 75 80

Ser Ser Tyr Ser Glu Pro Leu Val Lys Lys Arg Ala Val Leu Leu Thr
 85 90 95

Pro Leu Asn Pro Asp Tyr Thr Phe Glu Asn Phe Val Val Gly Pro Gly
 100 105 110

Asn Ser Phe Ala Tyr His Ala Ala Leu Glu Val Ala Lys His Pro Gly
 115 120 125

Arg Tyr Asn Pro Leu Phe Ile Tyr Gly Gly Val Gly Leu Gly Lys Thr
 130 135 140

His Leu Leu Gln Ser Ile Gly Asn Tyr Val Val Gln Asn Glu Pro Asp
 145 150 155 160

Leu Arg Val Met Tyr Ile Thr Ser Glu Lys Phe Leu Asn Asp Leu Val
 165 170 175

Asp	Ser	Met	Lys	Glu	Gly	Lys	Leu	Asn	Glu	Phe	Arg	Glu	Lys	Tyr	Arg
		180				185						190			
Lys	Lys	Val	Asp	Ile	Leu	Leu	Ile	Asp	Asp	Val	Gln	Phe	Leu	Ile	Gly
	195				200						205				
Lys	Thr	Gly	Val	Gln	Thr	Glu	Leu	Phe	His	Thr	Phe	Asn	Glu	Leu	His
	210			215			220								
Asp	Ser	Gly	Lys	Gln	Ile	Val	Ile	Cys	Ser	Asp	Arg	Glu	Pro	Gln	Lys
	225			230			235					240			
Leu	Ser	Glu	Phe	Gln	Asp	Arg	Leu	Val	Ser	Arg	Phe	Gln	Met	Gly	Leu
	245			250			255								
Val	Ala	Lys	Leu	Glu	Pro	Pro	Asp	Glu	Glu	Thr	Arg	Lys	Ser	Ile	Ala
	260			265			270								
Arg	Lys	Met	Leu	Glu	Ile	Glu	His	Gly	Glu	Leu	Pro	Glu	Glu	Val	Leu
	275			280			285								
Asn	Phe	Val	Ala	Glu	Asn	Val	Asp	Asp	Asn	Leu	Arg	Arg	Leu	Arg	Gly
	290			295			300								
Ala	Ile	Ile	Lys	Leu	Leu	Val	Tyr	Lys	Glu	Thr	Thr	Gly	Lys	Glu	Val
	305			310			315					320			
Asp	Leu	Lys	Glu	Ala	Ile	Leu	Leu	Lys	Asp	Phe	Ile	Lys	Pro	Asn	
	325			330			335								
Arg	Val	Lys	Ala	Met	Asp	Pro	Ile	Asp	Glu	Leu	Ile	Glu	Ile	Val	Ala
	340			345			350								
Lys	Val	Thr	Gly	Val	Pro	Arg	Glu	Glu	Ile	Leu	Ser	Asn	Ser	Arg	Asn
	355			360			365								
Val	Lys	Ala	Leu	Thr	Ala	Arg	Arg	Ile	Gly	Met	Tyr	Val	Ala	Lys	Asn
	370			375			380								
Tyr	Leu	Lys	Ser	Ser	Leu	Arg	Thr	Ile	Ala	Glu	Lys	Phe	Asn	Arg	Ser
	385			390			395					400			
His	Pro	Val	Val	Asp	Ser	Val	Lys	Lys	Val	Lys	Asp	Ser	Leu	Leu	
	405			410			415								
Lys	Gly	Asn	Lys	Gln	Leu	Lys	Ala	Leu	Ile	Asp	Glu	Val	Ile	Gly	Glu
	420			425			430								

Ile Ser Arg Arg Ala Leu Ser Gly
435 440

<210> 103
<211> 457
<212> PRT
<213> Helicobacter pylori

<400> 103
Met Asp Thr Asn Asn Asn Ile Glu Lys Glu Ile Leu Ala Leu Val Lys
1 5 10 15

Gln Asn Pro Lys Val Ser Leu Ile Glu Tyr Glu Asn Tyr Phe Ser Gln
20 25 30

Leu Lys Tyr Asn Pro Asn Ala Ser Lys Ser Asp Ile Ala Phe Phe Tyr
35 40 45

Ala Pro Asn Gln Val Leu Cys Thr Thr Ile Thr Ala Lys Tyr Gly Ala
50 55 60

Leu Leu Lys Glu Ile Leu Ser Gln Asn Lys Val Gly Met His Leu Ala
65 70 75 80

His Ser Val Asp Val Arg Ile Glu Val Ala Pro Lys Ile Gln Ile Asn
85 90 95

Ala Gln Ser Asn Ile Asn Tyr Lys Ala Ile Lys Thr Ser Val Lys Asp
100 105 110

Ser Tyr Thr Phe Glu Asn Phe Val Val Gly Ser Cys Asn Asn Thr Val
115 120 125

Tyr Glu Ile Ala Lys Lys Val Ala Gln Ser Asp Thr Pro Pro Tyr Asn
130 135 140

Pro Val Leu Phe Tyr Gly Gly Thr Gly Leu Gly Lys Thr His Ile Leu
145 150 155 160

Asn Ala Ile Gly Asn His Ala Leu Glu Lys His Lys Lys Val Val Leu
165 170 175

Val Thr Ser Glu Asp Phe Leu Thr Asp Phe Leu Lys His Leu Asp Asn
180 185 190

Lys Thr Met Asp Ser Phe Lys Ala Lys Tyr Arg His Cys Asp Phe Phe
195 200 205

Leu Leu Asp Asp Ala Gln Phe Leu Gln Gly Lys Pro Lys Leu Glu Glu
210 215 220

Glu Phe Phe His Thr Phe Asn Glu Leu His Ala Asn Ser Lys Gln Ile
225 230 235 240

Val Leu Ile Ser Asp Arg Ser Pro Lys Asn Ile Ala Gly Leu Glu Asp
245 250 255

Arg Leu Lys Ser Arg Phe Glu Trp Gly Ile Thr Ala Lys Val Met Pro
260 265 270

Pro Asp Leu Glu Thr Lys Leu Ser Ile Val Lys Gln Lys Cys Gln Leu
275 280 285

Asn Gln Ile Thr Leu Pro Glu Glu Val Met Glu Tyr Ile Ala Gln His
290 295 300

Ile Ser Asp Asn Ile Arg Gln Met Glu Gly Ala Ile Ile Lys Ile Ser
305 310 315 320

Val Asn Ala Asn Leu Met Asn Ala Ser Ile Asp Leu Asn Leu Ala Lys
325 330 335

Thr Val Leu Glu Asp Leu Gln Lys Asp His Ala Glu Gly Ser Ser Leu
340 345 350

Glu Asn Ile Leu Leu Ala Val Ala Gln Ser Leu Asn Leu Lys Ser Ser
355 360 365

Glu Ile Lys Val Ser Ser Arg Gln Lys Asn Val Ala Leu Ala Arg Lys
370 375 380

Leu Val Val Tyr Phe Ala Arg Leu Tyr Thr Pro Asn Pro Thr Leu Ser
385 390 395 400

Leu Ala Gln Phe Leu Asp Leu Lys Asp His Ser Ser Ile Ser Lys Met
405 410 415

Tyr Ser Gly Val Lys Lys Met Leu Glu Glu Lys Ser Pro Phe Val
420 425 430

Leu Ser Leu Arg Glu Glu Ile Lys Asn Arg Leu Asn Glu Leu Asn Asp
435 440 445

Lys Lys Thr Ala Phe Asn Ser Ser Glu
450 455

<210> 104
<211> 1305
<212> DNA
<213> Thermus thermophilus

<400> 104

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gtggagttcc acacctggtt taaaaggatc cgcccccttg ggatccggga cgggggtgctg 120
gagctcgccg tgcccacctc ctttgcctg gactggatcc ggcgccacta cgccggcctc 180
atccaggagg gccctcggtc ctcggggcc caggcgcccc ggtttagact ccgggtggtg 240
cccggggtcg tagtccagga ggacatcttc cagccccgc cgagcccccc ggccaagct 300
caacccgaag ataccttaa aacttcgtgg tggggcccaa caactccatg gcccacggc 360
ggcgcgtgg ccgtggccga gtcccccggc cggcctaca acccccttt catctacggg 420
ggccgtggcc tggaaagac ctacctgatg cacggcgtgg gcccactccg tgcaagcgc 480
ttccccaca tgagattaga gtacgtttcc acggaaactt tcaccaacga gctcatcaac 540
cgcccatccg cgagggaccg gatgacggag ttccggagc ggtaccgctc cgtggacctc 600
ctgctggtg agcacgtcca gttcatcgcc ggaaaggagc gcacccagga ggagttttc 660
cacacccctca acgcccccta cgaggccccac aagcagatca tcctctcctc cgaccggccg 720
cccaaggaca tcctcaccct ggaggcgcgc ctgcggagcc gctttgagtg gggctgatc 780
accgacaatc cagccccca cctggaaacc cggatcgcca tcctgaagat gaacgccagc 840
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gcggaccctt tggagatcat cgcggaaagcg gcgggaccag ttgcgcctga aaccccgaaa 1080
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gaccacacca cggtcctcta cgccatccag aaggtccagg agctcgccga aagcgaccgg 1260
gaggtgcagg gcctcctccg caccctccgg gaggcgtgca catga 1305

<210> 105
<211> 434
<212> PRT
<213> Thermus thermophilus

<400> 105

Val	Ser	His	Glu	Ala	Val	Trp	Gln	His	Val	Leu	Glu	His	Ile	Arg	Arg
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Ser Ile Thr Glu Val Glu Phe His Thr Trp Phe Glu Arg Ile Arg Pro
20 25 30

Leu Gly Ile Arg Asp Gly Val Leu Glu Leu Ala Val Pro Thr Ser Phe
35 40 45

Ala Leu Asp Trp Ile Arg Arg His Tyr Ala Gly Leu Ile Gln Glu Gly

50	55	60
Pro Arg Leu Leu Gly Ala Gln Ala Pro Arg Phe Glu Leu Arg Val Val		
65	70	75
Pro Gly Val Val Val Gln Glu Asp Ile Phe Gln Pro Pro Pro Ser Pro		
85	90	95
Pro Ala Gln Ala Gln Pro Glu Asp Thr Phe Lys Thr Ser Trp Trp Gly		
100	105	110
Pro Thr Thr Pro Trp Pro His Gly Gly Ala Val Ala Val Ala Glu Ser		
115	120	125
Pro Gly Arg Ala Tyr Asn Pro Leu Phe Ile Tyr Gly Gly Arg Gly Leu		
130	135	140
Gly Lys Thr Tyr Leu Met His Ala Val Gly Pro Leu Arg Ala Lys Arg		
145	150	155
Phe Pro His Met Arg Leu Glu Tyr Val Ser Thr Glu Thr Phe Thr Asn		
165	170	175
Glu Leu Ile Asn Arg Pro Ser Ala Arg Asp Arg Met Thr Glu Phe Arg		
180	185	190
Glu Arg Tyr Arg Ser Val Asp Leu Leu Leu Val Asp Asp Val Gln Phe		
195	200	205
Ile Ala Gly Lys Glu Arg Thr Gln Glu Glu Phe Phe His Thr Phe Asn		
210	215	220
Ala Leu Tyr Glu Ala His Lys Gln Ile Ile Leu Ser Ser Asp Arg Pro		
225	230	235
Pro Lys Asp Ile Leu Thr Leu Glu Ala Arg Leu Arg Ser Arg Phe Glu		
245	250	255
Trp Gly Leu Ile Thr Asp Asn Pro Ala Pro Asp Leu Glu Thr Arg Ile		
260	265	270
Ala Ile Leu Lys Met Asn Ala Ser Ser Gly Pro Glu Asp Pro Glu Asp		
275	280	285
Ala Leu Glu Tyr Ile Ala Arg Gln Val Thr Ser Asn Ile Arg Glu Trp		
290	295	300
Glu Gly Ala Leu Met Arg Ala Ser Pro Phe Ala Ser Leu Asn Gly Val		

305 310 315 320

Glu Leu Thr Arg Ala Val Ala Ala Lys Ala Leu Arg His Leu Arg Pro
325 330 335

Arg Glu Leu Glu Ala Asp Pro Leu Glu Ile Ile Arg Lys Ala Ala Gly
340 345 350

Pro Val Arg Pro Glu Thr Pro Gly Gly Ala His Gly Glu Arg Arg Lys
355 360 365

Lys Glu Val Val Leu Pro Arg Gln Leu Ala Met Tyr Leu Val Arg Glu
370 375 380

Leu Thr Pro Ala Ser Leu Pro Glu Ile Asp Gln Leu Asn Asp Asp Arg
385 390 395 400

Asp His Thr Thr Val Leu Tyr Ala Ile Gln Lys Val Gln Glu Leu Ala
405 410 415

Glu Ser Asp Arg Glu Val Gln Gly Leu Leu Arg Thr Leu Arg Glu Ala
420 425 430

Cys Thr

<210> 106

<211> 1128

<212> DNA

<213> Thermus thermophilus

<400> 106

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gtccccctcta gaagcgccaa cccccctctac acctacctgg ggctttacgc cgaggaaggg 120
gccttgcattc tcttcgggac caacggggag gtggacacctg aggtccgcct ccccgccgag 180
gccaaagcc ttccccgggt gctcgccccccc gcccagccct tcttccagct ggtgcggagc 240
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gagctctcct ccgggcgttt ccgcacccgg ctcaacctgg cccctgcca gggctacccc 360
gagttctgg tgccccgggg ggaggacaag ggggccttcc ccctccggac gcggatgcc 420
tccggggagc tcgtcaaggc cttgacccac gtgcgtacg ccgcgagcaa cgaggagtac 480
cggccatct tccgcggggt gcagctggag ttctcccccc agggcttccg ggccgtggcc 540
tccgacgggtt accgcctcgc cctctacgac ctgcggctgc cccaaagggtt ccaggccaag 600
gccgttgtcc cccggggag cgtggacgag atggtgccgg tccctgaaggg ggcggacggg 660
gcccaggccg tccctcgccct gggcgagggg gtgttggccc tggccctcga gggcggaaagc 720
gggttccgga tggccctccg cctcatggaa ggggagttcc ccgactacca gagggtcatc 780
ccccaggagt tccctcccaa ggtccaggtg gagggggagg ccctcaggga ggcggtgccgc 840
cgggtgagcg tccctccgaa cccggcagaac caccgggtgg acctccttt ggaggaaggc 900

cggatcctcc tctccgccga gggggactac ggcaaggggc aggaggaggt gcccgcccag 960
gtggaggggc cggacatggc cgtggcctac aacgcccgt acctcctcga ggccctcgcc 1020
cccggtgggg accgggcccc cctgggcatc tccgggcccc cgagcccgag cctcatctgg 1080
ggggacgggg aggggtaccg ggcggtggtg gtgcccctca gggtctag 1128

<210> 107

<211> 376

<212> PRT

<213> Thermus thermophilus

<400> 107

Met Asn Ile Thr Val Pro Lys Lys Leu Leu Ser Asp Gln Leu Ser Leu
1 5 10 15

Leu Glu Arg Ile Val Pro Ser Arg Ser Ala Asn Pro Leu Tyr Thr Tyr
20 25 30

Leu Gly Leu Tyr Ala Glu Glu Gly Ala Leu Ile Leu Phe Gly Thr Asn
35 40 45

Gly Glu Val Asp Leu Glu Val Arg Leu Pro Ala Glu Ala Gln Ser Leu
50 55 60

Pro Arg Val Leu Val Pro Ala Gln Pro Phe Phe Gln Leu Val Arg Ser
65 70 75 80

Leu Pro Gly Asp Leu Val Ala Leu Gly Leu Ala Ser Glu Pro Gly Gln
85 90 95

Gly Gly Gln Leu Glu Leu Ser Ser Gly Arg Phe Arg Thr Arg Leu Ser
100 105 110

Leu Ala Pro Ala Glu Gly Tyr Pro Glu Leu Leu Val Pro Glu Gly Glu
115 120 125

Asp Lys Gly Ala Phe Pro Leu Arg Thr Arg Met Pro Ser Gly Glu Leu
130 135 140

Val Lys Ala Leu Thr His Val Arg Tyr Ala Ala Ser Asn Glu Glu Tyr
145 150 155 160

Arg Ala Ile Phe Arg Gly Val Gln Leu Glu Phe Ser Pro Gln Gly Phe
165 170 175

Arg Ala Val Ala Ser Asp Gly Tyr Arg Leu Ala Leu Tyr Asp Leu Pro
180 185 190

Leu	Pro	Gln	Gly	Phe	Gln	Ala	Lys	Ala	Val	Val	Pro	Ala	Arg	Ser	Val
195						200					205				
Asp	Glu	Met	Val	Arg	Val	Leu	Lys	Gly	Ala	Asp	Gly	Ala	Glu	Ala	Val
210					215					220					
Leu	Ala	Leu	Gly	Glu	Gly	Val	Leu	Ala	Leu	Ala	Leu	Glu	Gly	Gly	Ser
225					230				235				240		
Gly	Val	Arg	Met	Ala	Leu	Arg	Leu	Met	Glu	Gly	Glu	Phe	Pro	Asp	Tyr
245						250						255			
Gln	Arg	Val	Ile	Pro	Gln	Glu	Phe	Ala	Leu	Lys	Val	Gln	Val	Glu	Gly
260						265				270					
Glu	Ala	Leu	Arg	Glu	Ala	Val	Arg	Arg	Val	Ser	Val	Leu	Ser	Asp	Arg
275						280				285					
Gln	Asn	His	Arg	Val	Asp	Leu	Leu	Leu	Glu	Gly	Arg	Ile	Leu	Leu	
290						295				300					
Ser	Ala	Glu	Gly	Asp	Tyr	Gly	Lys	Gly	Gln	Glu	Glu	Val	Pro	Ala	Gln
305						310				315			320		
Val	Glu	Gly	Pro	Asp	Met	Ala	Val	Ala	Tyr	Asn	Ala	Arg	Tyr	Leu	Leu
325							330				335				
Glu	Ala	Leu	Ala	Pro	Val	Gly	Asp	Arg	Ala	His	Leu	Gly	Ile	Ser	Gly
340							345				350				
Pro	Thr	Ser	Pro	Ser	Leu	Ile	Trp	Gly	Asp	Gly	Glu	Gly	Tyr	Arg	Ala
355							360				365				
Val	Val	Val	Pro	Leu	Arg	Val	Glx								
370						375									

<210> 108
<211> 376
<212> PRT
<213> Thermus thermophilus

<400> 108															
Met	Asn	Ile	Thr	Val	Pro	Lys	Lys	Leu	Leu	Ser	Asp	Gln	Leu	Ser	Leu
1					5				10			15			
Leu	Glu	Arg	Ile	Val	Pro	Ser	Arg	Ser	Ala	Asn	Pro	Leu	Tyr	Thr	Tyr
20						25						30			

Leu Gly Leu Tyr Ala Glu Glu Gly Ala Leu Ile Leu Phe Gly Thr Asn
 35 40 45

Gly Glu Val Asp Leu Glu Val Arg Leu Pro Ala Glu Ala Gln Ser Leu
 50 55 60

Pro Arg Val Leu Val Pro Ala Gln Pro Phe Phe Gln Leu Val Arg Ser
 65 70 75 80

Leu Pro Gly Asp Leu Val Ala Leu Gly Leu Ala Ser Glu Pro Gly Gln
 85 90 95

Gly Gly Gln Leu Glu Leu Ser Ser Gly Arg Phe Arg Thr Arg Leu Ser
 100 105 110

Leu Ala Pro Ala Glu Gly Tyr Pro Glu Leu Leu Val Pro Glu Gly Glu
 115 120 125

Asp Lys Gly Ala Phe Pro Leu Arg Thr Arg Met Pro Ser Gly Glu Leu
 130 135 140

Val Lys Ala Leu Thr His Val Arg Tyr Ala Ala Ser Asn Glu Glu Tyr
 145 150 155 160

Arg Ala Ile Phe Arg Gly Val Gln Leu Glu Phe Ser Pro Gln Gly Phe
 165 170 175

Arg Ala Val Ala Ser Asp Gly Tyr Arg Leu Ala Leu Tyr Asp Leu Pro
 180 185 190

Leu Pro Gln Gly Phe Gln Ala Lys Ala Val Val Pro Ala Arg Ser Val
 195 200 205

Asp Glu Met Val Arg Val Leu Lys Gly Ala Asp Gly Ala Glu Ala Val
 210 215 220

Leu Ala Leu Gly Glu Gly Val Leu Ala Leu Ala Leu Glu Gly Gly Ser
 225 230 235 240

Gly Val Arg Met Ala Leu Arg Leu Met Glu Gly Glu Phe Pro Asp Tyr
 245 250 255

Gln Arg Val Ile Pro Gln Glu Phe Ala Leu Lys Val Gln Val Glu Gly
 260 265 270

Glu Ala Leu Arg Glu Ala Val Arg Arg Val Ser Val Leu Ser Asp Arg
 275 280 285

Gln	Asn	His	Arg	Val	Asp	Leu	Leu	Leu	Glu	Glu	Gly	Arg	Ile	Leu	Leu
290						295						300			
Ser	Ala	Glu	Gly	Asp	Tyr	Gly	Lys	Gly	Gln	Glu	Glu	Val	Pro	Ala	Gln
305						310			315				320		
Val	Glu	Gly	Pro	Asp	Met	Ala	Val	Ala	Tyr	Asn	Ala	Arg	Tyr	Leu	Leu
					325				330				335		
Glu	Ala	Leu	Ala	Pro	Val	Gly	Asp	Arg	Ala	His	Leu	Gly	Ile	Ser	Gly
					340			345				350			
Pro	Thr	Ser	Pro	Ser	Leu	Ile	Trp	Gly	Asp	Gly	Glu	Gly	Tyr	Arg	Ala
					355			360				365			
Val	Val	Val	Pro	Leu	Arg	Val	Glx								
					370			375							

<210> 109
<211> 367
<212> PRT
<213> Escherichia coli

<400> 109															
Met	Lys	Phe	Thr	Val	Glu	Arg	Glu	His	Leu	Leu	Lys	Pro	Leu	Gln	Gln
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Val	Ser	Gly	Pro	Leu	Gly	Gly	Arg	Pro	Thr	Leu	Pro	Ile	Leu	Gly	Asn
				20					25				30		
Leu	Leu	Leu	Gln	Val	Ala	Asp	Gly	Thr	Leu	Ser	Leu	Thr	Gly	Thr	Asp
				35				40				45			
Leu	Glu	Met	Glu	Met	Val	Ala	Arg	Val	Ala	Leu	Val	Gln	Pro	His	Glu
				50				55				60			
Pro	Gly	Ala	Thr	Thr	Val	Pro	Ala	Arg	Lys	Phe	Phe	Asp	Ile	Cys	Arg
				65				70			75			80	
Gly	Leu	Pro	Glu	Gly	Ala	Glu	Ile	Ala	Val	Gln	Leu	Glu	Gly	Glu	Arg
				85					90				95		
Met	Leu	Val	Arg	Ser	Gly	Arg	Ser	Arg	Phe	Ser	Leu	Ser	Thr	Leu	Pro
				100					105				110		
Ala	Ala	Asp	Phe	Pro	Asn	Leu	Asp	Asp	Trp	Gln	Ser	Glu	Val	Glu	Phe

115	120	125
Thr Leu Pro Gln Ala Thr Met Lys Arg Leu Ile Glu Ala Thr Gln Phe		
130	135	140
Ser Met Ala His Gln Asp Val Arg Tyr Tyr Leu Asn Gly Met Leu Phe		
145	150	155
Glu Thr Glu Gly Glu Leu Arg Thr Val Ala Thr Asp Gly His Arg		
165	170	175
Leu Ala Val Cys Ser Met Pro Ile Gly Gln Ser Leu Pro Ser His Ser		
180	185	190
Val Ile Val Pro Arg Lys Gly Val Ile Glu Leu Met Arg Met Leu Asp		
195	200	205
Gly Gly Asp Asn Pro Leu Arg Val Gln Ile Gly Ser Asn Asn Ile Arg		
210	215	220
Ala His Val Gly Asp Phe Ile Phe Thr Ser Lys Leu Val Asp Gly Arg		
225	230	235
Phe Pro Asp Tyr Arg Arg Val Leu Pro Lys Asn Pro Asp Lys His Leu		
245	250	255
Glu Ala Gly Cys Asp Leu Leu Lys Gln Ala Phe Ala Arg Ala Ala Ile		
260	265	270
Leu Ser Asn Glu Lys Phe Arg Gly Val Arg Leu Tyr Val Ser Glu Asn		
275	280	285
Gln Leu Lys Ile Thr Ala Asn Asn Pro Glu Gln Glu Glu Ala Glu Glu		
290	295	300
Ile Leu Asp Val Thr Tyr Ser Gly Ala Glu Met Glu Ile Gly Phe Asn		
305	310	315
Val Ser Tyr Val Leu Asp Val Leu Asn Ala Leu Lys Cys Glu Asn Val		
325	330	335
Arg Met Met Leu Thr Asp Ser Val Ser Ser Val Gln Ile Glu Asp Ala		
340	345	350
Ala Ser Gln Ser Ala Ala Tyr Val Val Met Pro Met Arg Leu Glx		
355	360	365

<210> 110
<211> 367
<212> PRT
<213> Proteus mirabilis

<400> 110
Met Lys Phe Ile Ile Glu Arg Glu Gln Leu Leu Lys Pro Leu Gln Gln
1 5 10 15

Val Ser Gly Pro Leu Gly Gly Arg Pro Thr Leu Pro Ile Leu Gly Asn
20 25 30

Leu Leu Leu Lys Val Thr Glu Asn Thr Leu Ser Leu Thr Gly Thr Asp
35 40 45

Leu Glu Met Glu Met Met Ala Arg Val Ser Leu Ser Gln Ser His Glu
50 55 60

Ile Gly Ala Thr Thr Val Pro Ala Arg Lys Phe Phe Asp Ile Trp Arg
65 70 75 80

Gly Leu Pro Glu Gly Ala Glu Ile Ser Val Glu Leu Asp Gly Asp Arg
85 90 95

Leu Leu Val Arg Ser Gly Arg Ser Arg Phe Ser Leu Ser Thr Leu Pro
100 105 110

Ala Ser Asp Phe Pro Asn Leu Asp Asp Trp Gln Ser Glu Val Glu Phe
115 120 125

Thr Leu Pro Gln Ala Thr Leu Lys Arg Leu Ile Glu Ser Thr Gln Phe
130 135 140

Ser Met Ala His Gln Asp Val Arg Tyr Tyr Leu Asn Gly Met Leu Phe
145 150 155 160

Glu Thr Glu Asn Thr Glu Leu Arg Thr Val Ala Thr Asp Gly His Arg
165 170 175

Leu Ala Val Cys Ala Met Asp Ile Gly Gln Ser Leu Pro Gly His Ser
180 185 190

Val Ile Val Pro Arg Lys Gly Val Ile Glu Leu Met Arg Leu Leu Asp
195 200 205

Gly Ser Gly Glu Ser Leu Leu Gln Leu Gln Ile Gly Ser Asn Asn Leu
210 215 220

Arg	Ala	His	Val	Gly	Asp	Phe	Ile	Phe	Thr	Ser	Lys	Leu	Val	Asp	Gly
225				230					235					240	
Arg	Phe	Pro	Asp	Tyr	Arg	Arg	Val	Leu	Pro	Lys	Asn	Pro	Thr	Lys	Thr
	245						250						255		
Val	Ile	Ala	Gly	Cys	Asp	Ile	Leu	Lys	Gln	Ala	Phe	Ser	Arg	Ala	Ala
	260					265							270		
Ile	Leu	Ser	Asn	Glu	Lys	Phe	Arg	Gly	Val	Arg	Ile	Asn	Leu	Thr	Asn
	275				280					285					
Gly	Gln	Leu	Lys	Ile	Thr	Ala	Asn	Asn	Pro	Glu	Gln	Glu	Glu	Ala	Glu
	290				295					300					
Glu	Ile	Val	Asp	Val	Gln	Tyr	Gln	Gly	Glu	Glu	Met	Glu	Ile	Gly	Phe
	305			310					315				320		
Asn	Val	Ser	Tyr	Leu	Leu	Asp	Val	Leu	Asn	Thr	Leu	Lys	Cys	Glu	Glu
	325					330							335		
Val	Lys	Leu	Leu	Leu	Thr	Asp	Ala	Val	Ser	Ser	Val	Gln	Glu	Asn	
	340					345							350		
Val	Ala	Ser	Ala	Ala	Ala	Tyr	Val	Val	Met	Pro	Met	Arg	Leu		
	355					360							365		
<210>	111														
<211>	366														
<212>	PRT														
<213>	Haemophilus	influenzae													
<400>	111														
Met	Gln	Phe	Ser	Ile	Ser	Arg	Glu	Asn	Leu	Leu	Lys	Pro	Leu	Gln	Gln
	1			5					10				15		
Val	Cys	Gly	Val	Leu	Ser	Asn	Arg	Pro	Asn	Ile	Pro	Val	Leu	Asn	Asn
	20				25								30		
Val	Leu	Leu	Gln	Ile	Glu	Asp	Tyr	Arg	Leu	Thr	Ile	Thr	Gly	Thr	Asp
	35				40								45		
Leu	Glu	Val	Glu	Leu	Ser	Ser	Gln	Thr	Gln	Leu	Ser	Ser	Ser	Glu	
	50				55								60		
Asn	Gly	Thr	Phe	Thr	Ile	Pro	Ala	Lys	Lys	Phe	Leu	Asp	Ile	Cys	Arg
	65				70					75			80		

Thr	Leu	Ser	Asp	Asp	Ser	Glu	Ile	Thr	Val	Thr	Phe	Glu	Gln	Asp	Arg
			85						90					95	
Ala	Leu	Val	Gln	Ser	Gly	Arg	Ser	Arg	Phe	Thr	Leu	Ala	Thr	Gln	Pro
			100					105					110		
Ala	Glu	Glu	Tyr	Pro	Asn	Leu	Thr	Asp	Trp	Gln	Ser	Glu	Val	Asp	Phe
	115					120						125			
Glu	Leu	Pro	Gln	Asn	Thr	Leu	Arg	Arg	Leu	Ile	Glu	Ala	Thr	Gln	Phe
	130					135					140				
Ser	Met	Ala	Asn	Gln	Asp	Ala	Arg	Tyr	Phe	Leu	Asn	Gly	Met	Lys	Phe
	145				150					155			160		
Glu	Thr	Glu	Gly	Asn	Leu	Leu	Arg	Thr	Val	Ala	Thr	Asp	Gly	His	Arg
	165							170				175			
Leu	Ala	Val	Cys	Thr	Ile	Ser	Leu	Glu	Gln	Glu	Leu	Gln	Asn	His	Ser
	180						185					190			
Val	Ile	Leu	Pro	Arg	Lys	Gly	Val	Leu	Glu	Leu	Val	Arg	Leu	Leu	Glu
	195						200					205			
Thr	Asn	Asp	Glu	Pro	Ala	Arg	Leu	Gln	Ile	Gly	Thr	Asn	Asn	Leu	Arg
	210					215					220				
Val	His	Leu	Lys	Asn	Thr	Val	Phe	Thr	Ser	Lys	Leu	Ile	Asp	Gly	Arg
	225					230				235			240		
Phe	Pro	Asp	Tyr	Arg	Arg	Val	Leu	Pro	Arg	Asn	Ala	Thr	Lys	Ile	Val
	245							250				255			
Glu	Gly	Asn	Trp	Glu	Met	Leu	Lys	Gln	Ala	Phe	Ala	Arg	Ala	Ser	Ile
	260							265				270			
Leu	Ser	Asn	Glu	Arg	Ala	Arg	Ser	Val	Arg	Leu	Ser	Leu	Lys	Glu	Asn
	275							280				285			
Gln	Leu	Lys	Ile	Thr	Ala	Ser	Asn	Thr	Glu	His	Glu	Glu	Ala	Glu	Glu
	290					295					300				
Ile	Val	Asp	Val	Asn	Tyr	Asn	Gly	Glu	Glu	Leu	Glu	Val	Gly	Phe	Asn
	305						310					315		320	
Val	Thr	Tyr	Ile	Leu	Asp	Val	Leu	Asn	Ala	Leu	Lys	Cys	Asn	Gln	Val
	325							330				335			

Arg	Met	Cys	Leu	Thr	Asp	Ala	Phe	Ser	Ser	Cys	Leu	Ile	Glu	Asn	Cys
340							345							350	
Glu	Asp	Ser	Ser	Cys	Glu	Tyr	Val	Ile	Met	Pro	Met	Arg	Leu		
355					360								365		
<210>	112														
<211>	367														
<212>	PRT														
<213>	Pseudomonas	putida													
<400>	112														
Met	His	Phe	Thr	Ile	Gln	Arg	Glu	Ala	Leu	Leu	Lys	Pro	Leu	Gln	Leu
1									10					15	
Val	Ala	Gly	Val	Val	Glu	Arg	Arg	Gln	Thr	Leu	Pro	Val	Leu	Ser	Asn
20					25								30		
Val	Leu	Leu	Val	Val	Gln	Gly	Gln	Gln	Leu	Ser	Leu	Thr	Gly	Thr	Asp
35					40							45			
Leu	Glu	Val	Glu	Leu	Val	Gly	Arg	Val	Gln	Leu	Glu	Glu	Pro	Ala	Glu
50					55							60			
Pro	Gly	Glu	Ile	Thr	Val	Pro	Ala	Arg	Lys	Leu	Met	Asp	Ile	Cys	Lys
65					70				75				80		
Ser	Leu	Pro	Asn	Asp	Ala	Leu	Ile	Asp	Ile	Lys	Val	Asp	Glu	Gln	Lys
85					90							95			
Leu	Leu	Val	Lys	Ala	Gly	Arg	Ser	Arg	Phe	Thr	Leu	Ser	Thr	Leu	Pro
100					105							110			
Ala	Asn	Asp	Phe	Pro	Thr	Val	Glu	Glu	Gly	Pro	Gly	Ser	Leu	Thr	Cys
115					120							125			
Asn	Leu	Glu	Gln	Ser	Lys	Leu	Arg	Arg	Leu	Ile	Glu	Arg	Thr	Ser	Phe
130					135							140			
Ala	Met	Ala	Gln	Gln	Asp	Val	Arg	Tyr	Tyr	Leu	Asn	Gly	Met	Leu	Leu
145					150				155				160		
Glu	Val	Ser	Arg	Asn	Thr	Leu	Arg	Ala	Val	Ser	Thr	Asp	Gly	His	Arg
165					170							175			
Leu	Ala	Leu	Cys	Ser	Met	Ser	Ala	Pro	Ile	Glu	Gln	Glu	Asp	Arg	His

180	185	190
Gln Val Ile Val Pro Arg Lys Gly Ile Leu Glu Leu Ala Arg Leu Leu		
195	200	205
Thr Asp Pro Glu Gly Met Val Ser Ile Val Leu Gly Gln His His Ile		
210	215	220
Arg Ala Thr Thr Gly Glu Phe Thr Phe Thr Ser Lys Leu Val Asp Gly		
225	230	235
Lys Phe Pro Asp Tyr Glu Arg Val Leu Pro Lys Gly Gly Asp Lys Leu		
245	250	255
Val Val Gly Asp Arg Gln Ala Leu Arg Glu Ala Phe Ser Arg Thr Ala		
260	265	270
Ile Leu Ser Asn Glu Lys Tyr Arg Gly Ile Arg Leu Gln Leu Ala Ala		
275	280	285
Gly Gln Leu Lys Ile Gln Ala Asn Asn Pro Glu Gln Glu Glu Ala Glu		
290	295	300
Glu Glu Ile Ser Val Asp Tyr Glu Gly Ser Ser Leu Glu Ile Gly Phe		
305	310	315
Asn Val Ser Tyr Leu Leu Asp Val Leu Gly Val Met Thr Thr Glu Gln		
325	330	335
Val Arg Leu Ile Leu Ser Asp Ser Asn Ser Ser Ala Leu Leu Gln Glu		
340	345	350
Ala Gly Asn Asp Asp Ser Ser Tyr Val Val Met Pro Met Arg Leu		
355	360	365
<210> 113		
<211> 366		
<212> PRT		
<213> Buchnera aphidicola		
<400> 113		
Met Lys Phe Thr Ile Gln Asn Asp Ile Leu Thr Lys Asn Leu Lys Lys		
1	5	10
15		
Ile Thr Arg Val Leu Val Lys Asn Ile Ser Phe Pro Ile Leu Glu Asn		
20	25	30

Ile	Leu	Ile	Gln	Val	Glu	Asp	Gly	Thr	Leu	Ser	Leu	Thr	Thr	Thr	Asn
35									40						45
Leu	Glu	Ile	Glu	Leu	Ile	Ser	Lys	Ile	Glu	Ile	Ile	Thr	Lys	Tyr	Ile
50								55							60
Pro	Gly	Lys	Thr	Thr	Ile	Ser	Gly	Arg	Lys	Ile	Leu	Asn	Ile	Cys	Arg
65					70					75					80
Thr	Leu	Ser	Glu	Lys	Ser	Lys	Ile	Lys	Met	Gln	Leu	Lys	Asn	Lys	Lys
					85				90					95	
Met	Tyr	Ile	Ser	Ser	Glu	Asn	Ser	Asn	Tyr	Ile	Leu	Ser	Thr	Leu	Ser
					100				105					110	
Ala	Asp	Thr	Phe	Pro	Asn	His	Gln	Asn	Phe	Asp	Tyr	Ile	Ser	Lys	Phe
					115				120					125	
Asp	Ile	Ser	Ser	Asn	Ile	Leu	Lys	Glu	Met	Ile	Glu	Lys	Thr	Glu	Phe
					130			135			140				
Ser	Met	Gly	Lys	Gln	Asp	Val	Arg	Tyr	Tyr	Leu	Asn	Gly	Met	Leu	Leu
					145			150			155			160	
Glu	Lys	Lys	Asp	Lys	Phe	Leu	Arg	Ser	Val	Ala	Thr	Asp	Gly	Tyr	Arg
					165			170					175		
Leu	Ala	Ile	Ser	Tyr	Thr	Gln	Leu	Lys	Lys	Asp	Ile	Asn	Phe	Phe	Ser
					180			185			190				
Ile	Ile	Ile	Pro	Asn	Lys	Ala	Val	Met	Glu	Leu	Leu	Lys	Leu	Leu	Asn
					195			200			205				
Thr	Gln	Pro	Gln	Leu	Leu	Asn	Ile	Leu	Ile	Gly	Ser	Asn	Ser	Ile	Arg
					210			215			220				
Ile	Tyr	Thr	Lys	Asn	Leu	Ile	Phe	Thr	Thr	Gln	Leu	Ile	Glu	Gly	Glu
					225			230			235			240	
Tyr	Pro	Asp	Tyr	Lys	Ser	Val	Leu	Phe	Lys	Glu	Lys	Lys	Asn	Pro	Ile
					245			250			255				
Ile	Thr	Asn	Ser	Ile	Leu	Leu	Lys	Ser	Leu	Leu	Arg	Val	Ala	Ile	
					260			265			270				
Leu	Ala	His	Glu	Lys	Phe	Cys	Gly	Ile	Glu	Ile	Lys	Ile	Glu	Asn	Gly
					275			280			285				

Lys Phe Lys Val Leu Ser Asp Asn Gln Glu Glu Glu Thr Ala Glu Asp
290 295 300

Leu Phe Glu Ile Asp Tyr Phe Gly Glu Lys Ile Glu Ile Ser Ile Asn
305 310 315 320

Val Tyr Tyr Leu Leu Asp Val Ile Asn Asn Ile Lys Ser Glu Asn Ile
325 330 335

Ala Leu Phe Leu Asn Lys Ser Lys Ser Ser Ile Gln Ile Glu Ala Glu
340 345 350

Asn Asn Ser Ser Asn Ala Tyr Val Val Met Leu Leu Lys Arg
355 360 365

<210> 114

<211> 39

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 114

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39

<210> 115

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 115

gtgtggatcc gtggtgacct tagccac

27

<210> 116

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 116

ttcgtgtccg aggaccttgt ggtccacaac

30

<210> 117

<211> 3514

<212> DNA

<213> Aquifex aeolicus

<400> 117

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tcagaccacg gaaacctctt cggttcgtat aaattctaca aagccctgaa ggcggaagga 180
attaagccca taatcggcat ggaagcctac tttaccacgg gttcgaggtt tgacagaaaag 240
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ttcaagcgaa caacattcca gaacagggaaag tggcaaacag gaacttaata gagatagcca 600
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<210> 118
<211> 1161
<212> PRT
<213> Aquifex aeolicus

<400> 118

Met	Ser	Lys	Asp	Phe	Val	His	Leu	His	Leu	His	Thr	Gln	Phe	Ser	Leu
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Leu	Asp	Gly	Ala	Ile	Lys	Ile	Asp	Glu	Leu	Val	Lys	Lys	Ala	Lys	Glu
															30
20															

Tyr	Gly	Tyr	Lys	Ala	Val	Gly	Met	Ser	Asp	His	Gly	Asn	Leu	Phe	Gly
35															

Ser	Tyr	Lys	Phe	Tyr	Lys	Ala	Leu	Lys	Ala	Glu	Gly	Ile	Lys	Pro	Ile
50															

Ile	Gly	Met	Glu	Ala	Tyr	Phe	Thr	Thr	Gly	Ser	Arg	Phe	Asp	Arg	Lys
65															

Thr	Lys	Thr	Ser	Glu	Asp	Asn	Ile	Thr	Asp	Lys	Tyr	Asn	His	His	Leu
85															

Ile Leu Ile Ala Lys Asp Asp Lys Gly Leu Lys Asn Leu Met Lys Leu

	100	105	110
Ser Thr Leu Ala Tyr Lys Glu Gly Phe Tyr Tyr Lys Pro Arg Ile Asp			
115	120	125	
Tyr Glu Leu Leu Glu Lys Tyr Gly Glu Gly Leu Ile Ala Leu Thr Ala			
130	135	140	
Cys Leu Lys Gly Val Pro Thr Tyr Tyr Ala Ser Ile Asn Glu Val Lys			
145	150	155	160
Lys Ala Glu Glu Trp Val Lys Lys Phe Lys Asp Ile Phe Gly Asp Asp			
165	170	175	
Leu Tyr Leu Glu Leu Gln Ala Asn Asn Ile Pro Glu Gln Glu Val Ala			
180	185	190	
Asn Arg Asn Leu Ile Glu Ile Ala Lys Lys Tyr Asp Val Lys Leu Ile			
195	200	205	
Ala Thr Gln Asp Ala His Tyr Leu Asn Pro Glu Asp Arg Tyr Ala His			
210	215	220	
Thr Val Leu Met Ala Leu Gln Met Lys Lys Thr Ile His Glu Leu Ser			
225	230	235	240
Ser Gly Asn Phe Lys Cys Ser Asn Glu Asp Leu His Phe Ala Pro Pro			
245	250	255	
Glu Tyr Met Trp Lys Lys Phe Glu Gly Lys Phe Glu Gly Trp Glu Lys			
260	265	270	
Ala Leu Leu Asn Thr Leu Glu Val Met Glu Lys Thr Ala Asp Ser Phe			
275	280	285	
Glu Ile Phe Glu Asn Ser Thr Tyr Leu Leu Pro Lys Tyr Asp Val Pro			
290	295	300	
Pro Asp Lys Thr Leu Glu Tyr Leu Arg Glu Leu Ala Tyr Lys Gly			
305	310	315	320
Leu Arg Gln Arg Ile Glu Arg Gly Gln Ala Lys Asp Thr Lys Glu Tyr			
325	330	335	
Trp Glu Arg Leu Glu Tyr Glu Leu Glu Val Ile Asn Lys Met Gly Phe			
340	345	350	
Ala Gly Tyr Phe Leu Ile Val Gln Asp Phe Ile Asn Trp Ala Lys Lys			

355	360	365
Asn Asp Ile Pro Val Gly Pro Gly Arg Gly Ser Ala Gly Gly Ser Leu		
370	375	380
Val Ala Tyr Ala Ile Gly Ile Thr Asp Val Asp Pro Ile Lys His Gly		
385	390	395
Phe Leu Phe Glu Arg Phe Leu Asn Pro Glu Arg Val Ser Met Pro Asp		
405	410	415
Ile Asp Val Asp Phe Cys Gln Asp Asn Arg Glu Lys Val Ile Glu Tyr		
420	425	430
Val Arg Asn Lys Tyr Gly His Asp Asn Val Ala Gln Ile Ile Thr Tyr		
435	440	445
Asn Val Met Lys Ala Lys Gln Thr Leu Arg Asp Val Ala Arg Ala Met		
450	455	460
Gly Leu Pro Tyr Ser Thr Ala Asp Lys Leu Ala Lys Leu Ile Pro Gln		
465	470	475
Gly Asp Val Gln Gly Thr Trp Leu Ser Leu Glu Glu Met Tyr Lys Thr		
485	490	495
Pro Val Glu Glu Leu Leu Gln Lys Tyr Gly Glu His Arg Thr Asp Ile		
500	505	510
Glu Asp Asn Val Lys Lys Phe Arg Gln Ile Cys Glu Glu Ser Pro Glu		
515	520	525
Ile Lys Gln Leu Val Glu Thr Ala Leu Lys Leu Glu Gly Leu Thr Arg		
530	535	540
His Thr Ser Leu His Ala Ala Gly Val Val Ile Ala Pro Lys Pro Leu		
545	550	560
Ser Glu Leu Val Pro Leu Tyr Tyr Asp Lys Glu Gly Glu Val Ala Thr		
565	570	575
Gln Tyr Asp Met Val Gln Leu Glu Leu Gly Leu Leu Lys Met Asp		
580	585	590
Phe Leu Gly Leu Lys Thr Leu Thr Glu Leu Lys Leu Met Lys Glu Leu		
595	600	605
Ile Lys Glu Arg His Gly Val Asp Ile Asn Phe Leu Glu Leu Pro Leu		

610	615	620
Asp Asp Pro Lys Val Tyr Lys Leu Leu Gln Glu Gly Lys Thr Thr Gly		
625	630	635
Val Phe Gln Leu Glu Ser Arg Gly Met Lys Glu Leu Leu Lys Lys Leu		
645	650	655
Lys Pro Asp Ser Phe Asp Asp Ile Val Ala Val Leu Ala Leu Tyr Arg		
660	665	670
Pro Gly Pro Leu Lys Ser Gly Leu Val Asp Thr Tyr Ile Lys Arg Lys		
675	680	685
His Gly Lys Glu Pro Val Glu Tyr Pro Phe Pro Glu Leu Glu Pro Val		
690	695	700
Leu Lys Glu Thr Tyr Gly Val Ile Val Tyr Gln Glu Gln Val Met Lys		
705	710	715
Met Ser Gln Ile Leu Ser Gly Phe Thr Pro Gly Glu Ala Asp Thr Leu		
725	730	735
Arg Lys Ala Ile Gly Lys Lys Ala Asp Leu Met Ala Gln Met Lys		
740	745	750
Asp Lys Phe Ile Gln Gly Ala Val Glu Arg Gly Tyr Pro Glu Glu Lys		
755	760	765
Ile Arg Lys Leu Trp Glu Asp Ile Glu Lys Phe Ala Ser Tyr Ser Phe		
770	775	780
Asn Lys Ser His Ser Val Ala Tyr Gly Tyr Ile Ser Tyr Trp Thr Ala		
785	790	795
Tyr Val Lys Ala His Tyr Pro Ala Glu Phe Phe Ala Val Lys Leu Thr		
805	810	815
Thr Glu Lys Asn Asp Asn Lys Phe Leu Asn Leu Ile Lys Asp Ala Lys		
820	825	830
Leu Phe Gly Phe Glu Ile Leu Pro Pro Asp Ile Asn Lys Ser Asp Val		
835	840	845
Gly Phe Thr Ile Glu Gly Glu Asn Arg Ile Arg Phe Gly Leu Ala Arg		
850	855	860
Ile Lys Gly Val Gly Glu Glu Thr Ala Lys Ile Ile Val Glu Ala Arg		

865	870	875	880
Lys Lys Tyr Lys Gln Phe Lys Gly Leu Ala Asp Phe Ile Asn Lys Thr			
885	890	895	
Lys Asn Arg Lys Ile Asn Lys Lys Val Val Glu Ala Leu Val Lys Ala			
900	905	910	
Gly Ala Phe Asp Phe Thr Lys Lys Lys Arg Lys Glu Leu Leu Ala Lys			
915	920	925	
Val Ala Asn Ser Glu Lys Ala Leu Met Ala Thr Gln Asn Ser Leu Phe			
930	935	940	
Gly Ala Pro Lys Glu Glu Val Glu Leu Asp Pro Leu Lys Leu Glu			
945	950	955	960
Lys Glu Val Leu Gly Phe Tyr Ile Ser Gly His Pro Leu Asp Asn Tyr			
965	970	975	
Glu Lys Leu Leu Lys Asn Arg Tyr Thr Pro Ile Glu Asp Leu Glu Glu			
980	985	990	
Trp Asp Lys Glu Ser Glu Ala Val Leu Thr Gly Val Ile Thr Glu Leu			
995	1000	1005	
Lys Val Lys Lys Thr Lys Asn Gly Asp Tyr Met Ala Val Phe Asn Leu			
1010	1015	1020	
Val Asp Lys Thr Gly Leu Ile Glu Cys Val Val Phe Pro Gly Val Tyr			
1025	1030	1035	1040
Glu Glu Ala Lys Glu Leu Ile Glu Glu Asp Arg Val Val Val Lys			
1045	1050	1055	
Gly Phe Leu Asp Glu Asp Leu Glu Thr Glu Asn Val Lys Phe Val Val			
1060	1065	1070	
Lys Glu Val Phe Ser Pro Glu Glu Phe Ala Lys Glu Met Arg Asn Thr			
1075	1080	1085	
Leu Tyr Ile Phe Leu Lys Arg Glu Gln Ala Leu Asn Gly Val Ala Glu			
1090	1095	1100	
Lys Leu Lys Gly Ile Ile Glu Asn Asn Arg Thr Glu Asp Gly Tyr Asn			
1105	1110	1115	1120
Leu Val Leu Thr Val Asp Leu Gly Asp Tyr Phe Val Asp Leu Ala Leu			

1125

1130

1135

Pro Gln Asp Met Lys Leu Lys Ala Asp Arg Lys Val Val Glu Glu Ile
1140 1145 1150

Glu Lys Leu Gly Val Lys Val Ile Ile
1155 1160

<210> 119
<211> 2408
<212> DNA
<213> Aquifex aeolicus

<400> 119
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tacctcttg ccggaccgag gggggttggg aagacgacta ttgcaagaat tctcgcaaaa 180
gctttaact gtaaaaatcc ctccaaaggt gagccctgcg gtgagtgcga aaactgcagg 240
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<210> 120
<211> 473
<212> PRT
<213> Aquifex aeolicus

<400> 120

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20 25 30

Lys Asn Asp Arg Val Ala His Ala Tyr Leu Phe Ala Gly Pro Arg Gly
35 40 45

Val Gly Lys Thr Thr Ile Ala Arg Ile Leu Ala Lys Ala Leu Asn Cys
50 55 60

Lys Asn Pro Ser Lys Gly Glu Pro Cys Gly Glu Cys Glu Asn Cys Arg
65 70 75 80

Glu Ile Asp Arg Gly Val Phe Pro Asp Leu Ile Glu Met Asp Ala Ala
85 90 95

Ser Asn Arg Gly Ile Asp Asp Val Arg Ala Leu Lys Glu Ala Val Asn
100 105 110

Tyr Lys Pro Ile Lys Gly Lys Tyr Lys Val Tyr Ile Ile Asp Glu Ala
115 120 125

His Met Leu Thr Lys Glu Ala Phe Asn Ala Leu Lys Thr Leu Glu
130 135 140

Glu Pro Pro Pro Arg Thr Val Phe Val Leu Cys Thr Thr Glu Tyr Asp
145 150 155 160

Lys Ile Leu Pro Thr Ile Leu Ser Arg Cys Gln Arg Ile Ile Phe Ser
165 170 175

Lys	Val	Arg	Lys	Glu	Lys	Val	Ile	Glu	Tyr	Leu	Lys	Lys	Ile	Cys	Glu
180															190
Lys	Glu	Gly	Ile	Glu	Cys	Glu	Glu	Gly	Ala	Leu	Glu	Val	Leu	Ala	His
195															205
Ala	Ser	Glu	Gly	Cys	Met	Arg	Asp	Ala	Ala	Ser	Leu	Leu	Asp	Gln	Ala
210															220
Ser	Val	Tyr	Gly	Glu	Gly	Arg	Val	Thr	Lys	Glu	Val	Val	Glu	Asn	Phe
225															240
Leu	Gly	Ile	Leu	Ser	Gln	Glu	Ser	Val	Arg	Ser	Phe	Leu	Lys	Leu	Leu
245															255
Leu	Asn	Ser	Glu	Val	Asp	Glu	Ala	Ile	Lys	Phe	Leu	Arg	Glu	Leu	Ser
260															270
Glu	Lys	Gly	Tyr	Asn	Leu	Thr	Lys	Phe	Trp	Glu	Met	Leu	Glu	Glu	Glu
275															285
Val	Arg	Asn	Ala	Ile	Leu	Val	Lys	Ser	Leu	Lys	Asn	Pro	Glu	Ser	Val
290															300
Val	Gln	Asn	Trp	Gln	Asp	Tyr	Glu	Asp	Phe	Lys	Asp	Tyr	Pro	Leu	Glu
305															320
Ala	Leu	Leu	Tyr	Val	Glu	Asn	Leu	Ile	Asn	Arg	Gly	Lys	Val	Glu	Ala
325															335
Arg	Thr	Arg	Glu	Pro	Leu	Arg	Ala	Phe	Glu	Leu	Ala	Val	Ile	Lys	Ser
340															350
Leu	Ile	Val	Lys	Asp	Ile	Ile	Pro	Val	Ser	Gln	Leu	Gly	Ser	Val	Val
355															365
Lys	Glu	Thr	Lys	Glu	Glu	Lys	Val	Glu	Val	Lys	Glu	Glu	Pro		
370															380
Lys	Val	Lys	Glu	Glu	Lys	Pro	Lys	Glu	Gln	Glu	Glu	Asp	Arg	Phe	Gln
385															400
Lys	Val	Leu	Asn	Ala	Val	Asp	Gly	Lys	Ile	Leu	Lys	Arg	Ile	Leu	Glu
405															415
Gly	Ala	Lys	Arg	Glu	Glu	Arg	Asp	Gly	Lys	Ile	Val	Leu	Lys	Ile	Glu
420															430

Ala Ser Tyr Leu Arg Thr Met Lys Lys Glu Phe Asp Ser Leu Lys Glu
435 440 445

Thr Phe Pro Phe Leu Glu Phe Glu Pro Val Glu Asp Lys Lys Lys Pro
450 455 460

Gln Lys Ser Ser Gly Thr Arg Leu Phe
465 470

<210> 121

<211> 1090

<212> DNA

<213> Aquifex aeolicus

<400> 121

atgcgcgtta aggtggacag ggaggagctt gaagaggttc taaaaaaagc aagagaaagc 60
acggaaaaaa aagccgcact cccgatactc gcgaacttct tactctccgc aaaagaggaa 120
aacttaatcg taagggcaac ggacttggaa aactaccttg tagtctccgt aaagggggag 180
gttgaagagg aaggagaggt ttgcgtccac tctcaaaaac tctacgatat agtcaagaac 240
ttaaaattccg cttacgttta ctttcatacg gaaggtgaaa aactcgtcat aacgggagga 300
aagagtacgt acaaacttcc gacagctccc gcggaggact ttcccgaatt tccagaaatc 360
gtagaaggag gagaaacact ttcggaaac cttctcgta acggaataga aaaggttagag 420
tacgccatag cgaaggaaga agcgaacata gcccttcagg gaatgtatct gagaggatac 480
gaggacagaa ttcactttgt gttcggacgg tcacaggctt gcactttatg aacctctacg 540
taaacattga aaagagtgaa gacgagtctt ttgcttactt ctccactccc gagtgaaac 600
tcgcccgttag ctcccttggaaag gagaattccc ggactacatg agtgtcatcc ctgaggagtt 660
ttcggcggaa gtcttggttt agacagagga agtcttaaag gttttaaaga gtttgaaggc 720
tttaaagcgaa gaaaaagttt ttccctgtgaa gattacctta agcgaaaacc ttgcctatctt 780
ttagttcgcg gatccggagt tcggagaagc gagagaggaa attgaagtgg agtacacggg 840
agagcccttt gagataggat tcaacggaaa tactttatgg aggcgccttga cgcctacgac 900
agcgaaaagag tgtggttcaa gttcacaaacc cccgacacgg ccactttatt ggaggctgaa 960
gattacgaaa aggaaccta caagtgcata ataatgccga tgagggtgta gccatgaaaa 1020
aagcttaat cttttattt agcttgagcc tttaattcc tgcgttttagc gaagccaaac 1080
ccaagtcttc 1090

<210> 122

<211> 363

<212> PRT

<213> Aquifex aeolicus

<400> 122

Met Arg Val Lys Val Asp Arg Glu Glu Leu Glu Glu Val Leu Lys Lys
1 5 10 15

Ala Arg Glu Ser Thr Glu Lys Lys Ala Ala Leu Pro Ile Leu Ala Asn

20 25 30

Phe Leu Leu Ser Ala Lys Glu Glu Asn Leu Ile Val Arg Ala Thr Asp
35 40 45

Leu Glu Asn Tyr Leu Val Val Ser Val Lys Gly Glu Val Glu Glu Glu
50 55 60

Gly Glu Val Cys Val His Ser Gln Lys Leu Tyr Asp Ile Val Lys Asn
65 70 75 80

Leu Asn Ser Ala Tyr Val Tyr Leu His Thr Glu Gly Glu Lys Leu Val
85 90 95

Ile Thr Gly Gly Lys Ser Thr Tyr Lys Leu Pro Thr Ala Pro Ala Glu
100 105 110

Asp Phe Pro Glu Phe Pro Glu Ile Val Glu Gly Gly Glu Thr Leu Ser
115 120 125

Gly Asn Leu Leu Val Asn Gly Ile Glu Lys Val Glu Tyr Ala Ile Ala
130 135 140

Lys Glu Glu Ala Asn Ile Ala Leu Gln Gly Met Tyr Leu Arg Gly Tyr
145 150 155 160

Glu Asp Arg Ile His Phe Val Gly Ser Asp Gly His Arg Leu Ala Leu
165 170 175

Tyr Glu Pro Leu Gly Glu Phe Ser Lys Glu Leu Leu Ile Pro Arg Lys
180 185 190

Ser Leu Lys Val Leu Lys Lys Leu Ile Thr Gly Ile Glu Asp Val Asn
195 200 205

Ile Glu Lys Ser Glu Asp Glu Ser Phe Ala Tyr Phe Ser Thr Pro Glu
210 215 220

Trp Lys Leu Ala Val Arg Leu Leu Glu Gly Glu Phe Pro Asp Tyr Met
225 230 235 240

Ser Val Ile Pro Glu Glu Phe Ser Ala Glu Val Leu Phe Glu Thr Glu
245 250 255

Glu Val Leu Lys Val Leu Lys Arg Leu Lys Ala Leu Ser Glu Gly Lys
260 265 270

Val Phe Pro Val Lys Ile Thr Leu Ser Glu Asn Leu Ala Ile Phe Glu

275

280

285

Phe Ala Asp Pro Glu Phe Gly Glu Ala Arg Glu Glu Ile Glu Val Glu
290 295 300

Tyr Thr Gly Glu Pro Phe Glu Ile Gly Phe Asn Gly Lys Tyr Leu Met
305 310 315 320

Glu Ala Leu Asp Ala Tyr Asp Ser Glu Arg Val Trp Phe Lys Phe Thr
325 330 335

Thr Pro Asp Thr Ala Thr Leu Leu Glu Ala Glu Asp Tyr Glu Lys Glu
340 345 350

Pro Tyr Lys Cys Ile Ile Met Pro Met Arg Val
355 360

<210> 123

<211> 1093

<212> DNA

<213> Aquifex aeolicus

<400> 123

gtggaaacca caatattcca gttccagaaaa actttttca caaaaacctcc gaaggagagg 60
gtcttcgtcc ttcataggaga agagcagtat ctcataagaa ccttttgc taagctgaag 120
gaaaagtacg gggagaatta cacgggtctg tggggggatg agataagcga ggaggaattc 180
tacactgccc ttcccgagac cagtatattc ggcggttcaa aggaaaaaagc ggtggcatt 240
tacaacttcg gggatttcct gaagaagctc ggaaggaaga aaaaggaaaa agaaaggctt 300
ataaaaagtcc tcagaaacgt aaagagtaac tacgtattta tagtgtacga tgcgaaactc 360
cagaaacagg aactttctc ggaacctctg aaatccgtag cgtcttcgg cggtagtg 420
gtagcaaaca ggctgagcaa ggagaggata aaacagctcg tccttaagaa gttcaaagaa 480
aaagggataa acgtagaaaa cgatgccctt gaataccctc tccagctcac gggttacaac 540
ttgatggago tc当地acttga ggttggaaaa ctgatagatt acgcaagtga aaagaaaatt 600
ttaacactcg atgaggtaaa gagagtagcc ttctcgtct cagaaaaacgt aaacgtat 660
gagttcggtt atttactcct ct当地aaagat tacggaaaagg ctcttaaagt tttggactcc 720
ctcatttcct tc当地aaataca cccccctccag attatggaaaa tcctgtcctc ctatgctcta 780
aaactttaca ccctcaagag gcttgaagag aaggggagagg acctgaataa ggcgatggaa 840
agcgtggaa taaagaacaa ctttctcaag atgaagttca aatcttactt aaaggcaaac 900
tctaaagagg acttgaagaa ccttaatcctc tccctccaga ggtatagacgc tttttctaaa 960
cttactttc aggacacagt gcagttgctg gggatttctt gacctcaaga ctggagaggg 1020
aagttgtgaa aaataacttct catggtgat aatctttt atgaagtttgcgt 1080
tttcccggt tct 1093

<210> 124

<211> 350

<212> PRT

<213> Aquifex aeolicus

<400> 124

Val	Glu	Thr	Thr	Ile	Phe	Gln	Phe	Gln	Lys	Thr	Phe	Phe	Thr	Lys	Pro	
1				5					10						15	
Pro	Lys	Glu	Arg	Val	Phe	Val	Leu	His	Gly	Glu	Glu	Gln	Tyr	Leu	Ile	
				20					25					30		
Arg	Thr	Phe	Leu	Ser	Lys	Leu	Lys	Glu	Lys	Tyr	Gly	Glu	Asn	Tyr	Thr	
				35					40					45		
Val	Leu	Trp	Gly	Asp	Glu	Ile	Ser	Glu	Glu	Glu	Phe	Tyr	Thr	Ala	Leu	
				50					55					60		
Ser	Glu	Thr	Ser	Ile	Phe	Gly	Gly	Ser	Lys	Glu	Lys	Ala	Val	Val	Ile	
				65					70					75		80
Tyr	Asn	Phe	Gly	Asp	Phe	Leu	Lys	Lys	Leu	Gly	Arg	Lys	Lys	Glu		
				85					90					95		
Lys	Glu	Arg	Leu	Ile	Lys	Val	Leu	Arg	Asn	Val	Lys	Ser	Asn	Tyr	Val	
				100					105					110		
Phe	Ile	Val	Tyr	Asp	Ala	Lys	Leu	Gln	Lys	Gln	Glu	Leu	Ser	Ser	Glu	
				115					120					125		
Pro	Leu	Lys	Ser	Val	Ala	Ser	Phe	Gly	Gly	Ile	Val	Val	Ala	Asn	Arg	
				130					135					140		
Leu	Ser	Lys	Glu	Arg	Ile	Lys	Gln	Leu	Val	Leu	Lys	Lys	Phe	Lys	Glu	
				145					150					155		160
Lys	Gly	Ile	Asn	Val	Glu	Asn	Asp	Ala	Leu	Glu	Tyr	Leu	Leu	Gln	Leu	
				165					170					175		
Thr	Gly	Tyr	Asn	Leu	Met	Glu	Leu	Lys	Leu	Glu	Val	Glu	Lys	Leu	Ile	
				180					185					190		
Asp	Tyr	Ala	Ser	Glu	Lys	Lys	Ile	Leu	Thr	Leu	Asp	Glu	Val	Lys	Arg	
				195					200					205		
Val	Ala	Phe	Ser	Val	Ser	Glu	Asn	Val	Asn	Val	Phe	Glu	Phe	Val	Asp	
				210					215					220		
Leu	Leu	Leu	Leu	Lys	Asp	Tyr	Glu	Lys	Ala	Leu	Lys	Val	Leu	Asp	Ser	
				225					230					235		240

Leu Ile Ser Phe Gly Ile His Pro Leu Gln Ile Met Lys Ile Leu Ser
245 250 255

Ser Tyr Ala Leu Lys Leu Tyr Thr Leu Lys Arg Leu Glu Glu Lys Gly
260 265 270

Glu Asp Leu Asn Lys Ala Met Glu Ser Val Gly Ile Lys Asn Asn Phe
275 280 285

Leu Lys Met Lys Phe Lys Ser Tyr Leu Lys Ala Asn Ser Lys Glu Asp
290 295 300

Leu Lys Asn Leu Ile Leu Ser Leu Gln Arg Ile Asp Ala Phe Ser Lys
305 310 315 320

Leu Tyr Phe Gln Asp Thr Val Gln Leu Leu Arg Asp Phe Leu Thr Ser
325 330 335

Arg Leu Glu Arg Glu Val Val Lys Asn Thr Ser His Gly Gly
340 345 350

<210> 125

<211> 1051

<212> DNA

<213> Aquifex aeolicus

<400> 125

atggaaaaag ttttttggaa aaaactccag aaaacacctgc acatacccg aggactcctt 60
ttttacggca aagaaggaag cgaaaagacg aaaacagctt ttgaatttgc aaaaggattt 120
ttatgttaagg aaaacgtacc tggggatgctc gaagttgtcc ctcctgcaaa cacgtaaacg 180
agctggagga agccttcttt aaaggagaaa tagaagactt taaagtttat aagacaagga 240
cggtaaaaag cacttcgttt accttatggg cgaacatccc gactttgtgg taataatccc 300
gagcggacat tacataaaga tagaacagat aagggaaagtt aagaactttg cctatgtgaa 360
gccccgcacta agcaggagaa aagtaattat aatagacgac gcccacgca tgacctctca 420
ggcggcaaac gctctttaa agtatttggaa agagccacct gcggacacca cctttatctt 480
gaccacgaac aggcttctg caatcctgcc gactatcctc tccagaactt ttcaagtggaa 540
gttcaagggc tttcagtaa aagaggattt ggaaatagcg aaagtagacg aggaaatagc 600
gaaactctct ggaggcagtc taaaaaggcc tatcttacta aaggaaaaca aagatatcct 660
aaacaaaagta aaggaattct tgaaaaacga gccgttaaaa gtttacaagc ttgcaagtga 720
attcgaaaaag tggaaacctg aaaagcaaaa actcttcctt gaaattatgg aagaatttgtt 780
atctcaaaaa ttgaccgaag agaaaaaaga caattacacc taccttcttg atacgatcag 840
actctttaaa gacggactcg caaggggtgt aaacgaacct ctgtggctgt ttacgttagc 900
cgttcaggcg gattaataaa ccgttattga ttccgtaaaca tttaaacctt aatctaaatt 960
atgagagcct ttgaaggagg tctggtatgg aaaattgaa gattagatat atagatacga 1020
ggaagatagg aaccgtgagc ggtgtaaaag t 1051

<210> 126

<211> 305

<212> PRT

<213> Aquifex aeolicus

<400> 126

Met Glu Lys Val Phe Leu Glu Lys Leu Gln Lys Thr Leu His Ile Pro
1 5 10 15

Gly Gly Leu Leu Phe Tyr Gly Lys Glu Gly Ser Gly Lys Thr Lys Thr
20 25 30

Ala Phe Glu Phe Ala Lys Gly Ile Leu Cys Lys Glu Asn Val Pro Trp
35 40 45

Gly Cys Gly Ser Cys Pro Ser Cys Lys His Val Asn Glu Leu Glu Glu
50 55 60

Ala Phe Phe Lys Gly Glu Ile Glu Asp Phe Lys Val Tyr Lys Asp Lys
65 70 75 80

Asp Gly Lys Lys His Phe Val Tyr Leu Met Gly Glu His Pro Asp Phe
85 90 95

Val Val Ile Ile Pro Ser Gly His Tyr Ile Lys Ile Glu Gln Ile Arg
100 105 110

Glu Val Lys Asn Phe Ala Tyr Val Lys Pro Ala Leu Ser Arg Arg Lys
115 120 125

Val Ile Ile Ile Asp Asp Ala His Ala Met Thr Ser Gln Ala Ala Asn
130 135 140

Ala Leu Leu Lys Val Leu Glu Glu Pro Pro Ala Asp Thr Thr Phe Ile
145 150 155 160

Leu Thr Thr Asn Arg Arg Ser Ala Ile Leu Pro Thr Ile Leu Ser Arg
165 170 175

Thr Phe Gln Val Glu Phe Lys Gly Phe Ser Val Lys Glu Val Met Glu
180 185 190

Ile Ala Lys Val Asp Glu Glu Ile Ala Lys Leu Ser Gly Gly Ser Leu
195 200 205

Lys Arg Ala Ile Leu Leu Lys Glu Asn Lys Asp Ile Leu Asn Lys Val
210 215 220

Lys Glu Phe Leu Glu Asn Glu Pro Leu Lys Val Tyr Lys Leu Ala Ser
225 230 235 240

Glu Phe Glu Lys Trp Glu Pro Glu Lys Gln Lys Leu Phe Leu Glu Ile
245 250 255

Met Glu Glu Leu Val Ser Gln Lys Leu Thr Glu Glu Lys Lys Asp Asn
260 265 270

Tyr Thr Tyr Leu Leu Asp Thr Ile Arg Leu Phe Lys Asp Gly Leu Ala
275 280 285

Arg Gly Val Asn Glu Pro Leu Trp Leu Phe Thr Leu Ala Val Gln Ala
290 295 300

Asp
305

<210> 127

<211> 630

<212> DNA

<213> Aquifex aeolicus

<400> 127

atgaacttcc tgaaaaagtt ccttttactg agaaaaagctc aaaagtctcc ttacttcgaa 60
gagttctacg aagaaatcga tttgaaccag aaggtaaaag atgcaagggtt tgttagtttt 120
gactgcgaag ccacagaact cgacgtaaag aaggcaaaac tccttcaat aggtgcgggtt 180
gaggttaaaa acctggaaat agacctctct aaatctttt acgagatact caaaagtgcac 240
gagataaagg cggcggagat acatgaaata accagggaaag acgttgaaaa gtacggaaag 300
gaaccaaagg aagtaatata cgactttctg aagtacataa aggaaagcgt tctcggtggc 360
tactacgtga agtttgacgt ctcactcggt gagaagttact ccataaagta cttccagttat 420
ccaatcatca actacaagtt agacctgttt agttcgtga agagagagta ccagagtggc 480
aggagtcttg acgacccattt gaaggaactc ggtgttagaaa taaggcaag gcacaacgcc 540
cttgaagatg cctacataaac cgctttctt ttccctaaagt acgtttaccc gaacagggag 600
tacagactaa aggtatccc gatttcctt 630

<210> 128

<211> 210

<212> PRT

<213> Aquifex aeolicus

<400> 128

Met Asn Phe Leu Lys Lys Phe Leu Leu Leu Arg Lys Ala Gln Lys Ser
1 5 10 15

Pro Tyr Phe Glu Glu Phe Tyr Glu Glu Ile Asp Leu Asn Gln Lys Val

20 25 30

Lys Asp Ala Arg Phe Val Val Phe Asp Cys Glu Ala Thr Glu Leu Asp
35 40 45

Val Lys Lys Ala Lys Leu Leu Ser Ile Gly Ala Val Glu Val Lys Asn
50 55 60

Leu Glu Ile Asp Leu Ser Lys Ser Phe Tyr Glu Ile Leu Lys Ser Asp
65 70 75 80

Glu Ile Lys Ala Ala Glu Ile His Gly Ile Thr Arg Glu Asp Val Glu
85 90 95

Lys Tyr Gly Lys Glu Pro Lys Glu Val Ile Tyr Asp Phe Leu Lys Tyr
100 105 110

Ile Lys Gly Ser Val Leu Val Gly Tyr Tyr Val Lys Phe Asp Val Ser
115 120 125

Leu Val Glu Lys Tyr Ser Ile Lys Tyr Phe Gln Tyr Pro Ile Ile Asn
130 135 140

Tyr Lys Leu Asp Leu Phe Ser Phe Val Lys Arg Glu Tyr Gln Ser Gly
145 150 155 160

Arg Ser Leu Asp Asp Leu Met Lys Glu Leu Gly Val Glu Ile Arg Ala
165 170 175

Arg His Asn Ala Leu Glu Asp Ala Tyr Ile Thr Ala Leu Leu Phe Leu
180 185 190

Lys Tyr Val Tyr Pro Asn Arg Glu Tyr Arg Leu Lys Asp Leu Pro Ile
195 200 205

Phe Leu
210

<210> 129

<211> 526

<212> DNA

<213> Aquifex aeolicus

<400> 129

atgctcaata aggttttat aataggaaga cttacgggtg accccgttat aacttatcta 60
ccgagcggaa cgccccgtat agagtttact ctggcttaca acagaaggta taaaaaccag 120
aacggtaat ttcaggagga aagtcaacttc tttgacgtaa aggcgtaggg aaaaatggct 180

gaagactggg ctacacgctt ctcgaaagga tacctcgta tcgttagaggg aagactctcc 240
caggaaaagt gggagaaaga aggaaagaag ttctcaaagg tcaggataat agcgaaaaac 300
gtaagattaa taaacaggcc gaaaggtgct gaacttcaag cagaagaaga ggaggaagtt 360
cctcccattg aggaggaaat tgaaaaactc gtaaagagg aagagaagcc ttttaccgat 420
gaagaggacg aaataccctt ttaattttga ggaggttaaa gtatggtagt gagagctcct 480
aagaagaaag tttgtatgta ctgtgaacaa aagagagac cagatt 526

<210> 130

<211> 147

<212> PRT

<213> Aquifex aeolicus

<400> 130

Met Leu Asn Lys Val Phe Ile Ile Gly Arg Leu Thr Gly Asp Pro Val
1 5 10 15

Ile Thr Tyr Leu Pro Ser Gly Thr Pro Val Val Glu Phe Thr Leu Ala
20 25 30

Tyr Asn Arg Arg Tyr Lys Asn Gln Asn Gly Glu Phe Gln Glu Glu Ser
35 40 45

His Phe Phe Asp Val Lys Ala Tyr Gly Lys Met Ala Glu Asp Trp Ala
50 55 60

Thr Arg Phe Ser Lys Gly Tyr Leu Val Leu Val Glu Gly Arg Leu Ser
65 70 75 80

Gln Glu Lys Trp Glu Lys Glu Gly Lys Lys Phe Ser Lys Val Arg Ile
85 90 95

Ile Ala Glu Asn Val Arg Leu Ile Asn Arg Pro Lys Gly Ala Glu Leu
100 105 110

Gln Ala Glu Glu Glu Glu Val Pro Pro Ile Glu Glu Glu Ile Glu
115 120 125

Lys Leu Gly Lys Glu Glu Glu Lys Pro Phe Thr Asp Glu Glu Asp Glu
130 135 140

Ile Pro Phe

145

<210> 131

<211> 1472

<212> DNA

<213> Aquifex aeolicus

<400> 131

atgcaatttg tggataaaact tccctgtgac gaatccgccc agagggcggt tcttggcagt 60
atgcttgaag accccgaaaa catacctctg gtacttgaat accttaaaga agaagacttc 120
tgcatacgacg agcacaagct actttcagg gttcttacaa acctctgtc cgagtacggc 180
aataagctcg atttcgtatt aataaaaggat caccttggaaa agaaaaactt actccagaaa 240
atacctatag actggctcga agaactctac gaggaggcgg tatccccgtga cacgcttgag 300
gaagtctgca aaatagtaaa acaaacgttcc gcacagaggg cgataattca actcggtata 360
gaactcattc acaaaggaaa ggaaaacaaa gactttcaca cattaatcga ggaagcccag 420
agcaggatat ttccatagc ggaaagtgc acatctacgc agtttacca tgtgaaagac 480
gttgcggaag aagttataga actcatttat aaattcaaaa gctctgacag gctagtcacg 540
ggactcccaa gcggttcac ggaactcgat ctaaagacga cgggattcca ccctggagac 600
ttaataatac tcgcccgaag acccggtatg gggaaaaccg cctttatgct ctccataatc 660
tacaatctcg caaaagacga gggaaaaccc tcagctgtat ttcccttgaa aatgagcaag 720
gaacagctcg ttatgagact cctctctatg atgtcggagg tcccacttt caagataagg 780
tcttggaaagta taticaatga agatttaaag aagcttgaag caagcgcaat agaactcgca 840
aagtagcaca tatacctcga cgacacaccc gctctacta caacggattt aaggataagg 900
gcaagaaagc tcagaaagga aaaggaaagtt gagttcgtgg cggtggacta cttgcaactt 960
ctgagaccgc cagtcggaaa gagttcaaga caggaggaag tggcagaggt ttcaagaaac 1020
ttaaaagccc ttgcaaaagga acttcacatt cccgttatgg cacttgcgc gctctccgt 1080
gaggtggaaa agaggagtga taaaagaccc cagttgcgg acctcagaga atccggacag 1140
atagaacacgg acgcagaccc aatcctttc ctccacagac ccgagacta caagaaaaag 1200
ccaaatcccg aagagcaggg tatagcggaa gtgataatag ccaagcaaag gcaaggaccc 1260
acggacattt tgaagctcgc atttattaaag gactacacta agtttgcaaa cctagaagcc 1320
cttccttgaac aacctcctga agaagaggaa cttccgaaa ttattgaaac acaggaggat 1380
gaaggattcg aagatattga ctctgaaaaa ttaaggttt ataattttt cttggctatc 1440
cgggttagct caatcggcag agcgggtggc tg 1472

<210> 132

<211> 438

<212> PRT

<213> Aquifex aeolicus

<400> 132

Met Gln Phe Val Asp Lys Leu Pro Cys Asp Glu Ser Ala Glu Arg Ala
1 5 10 15

Val Leu Gly Ser Met Leu Glu Asp Pro Glu Asn Ile Pro Leu Val Leu
20 25 30

Glu Tyr Leu Lys Glu Glu Asp Phe Cys Ile Asp Glu His Lys Leu Leu
35 40 45

Phe Arg Val Leu Thr Asn Leu Trp Ser Glu Tyr Gly Asn Lys Leu Asp
50 55 60

Phe	Val	Leu	Ile	Lys	Asp	His	Leu	Glu	Lys	Lys	Asn	Leu	Leu	Gln	Lys
65							70				75				80
Ile	Pro	Ile	Asp	Trp	Leu	Glu	Glu	Leu	Tyr	Glu	Ala	Val	Ser	Pro	
				85				90				95			
Asp	Thr	Leu	Glu	Glu	Val	Cys	Lys	Ile	Val	Lys	Gln	Arg	Ser	Ala	Gln
					100			105				110			
Arg	Ala	Ile	Ile	Gln	Leu	Gly	Ile	Thr	Ser	Thr	Gln	Phe	Tyr	His	Val
					115			120				125			
Lys	Asp	Val	Ala	Glu	Glu	Val	Ile	Glu	Leu	Ile	Tyr	Lys	Phe	Lys	Ser
				130			135				140				
Ser	Asp	Arg	Leu	Val	Thr	Gly	Leu	Pro	Ser	Gly	Phe	Thr	Glu	Leu	Asp
				145	.		150			155			160		
Leu	Lys	Thr	Thr	Gly	Phe	His	Pro	Gly	Asp	Leu	Ile	Ile	Leu	Ala	Ala
				165			170				175				
Arg	Pro	Gly	Met	Gly	Lys	Thr	Ala	Phe	Met	Leu	Ser	Ile	Ile	Tyr	Asn
				180			185				190				
Leu	Ala	Lys	Asp	Glu	Gly	Lys	Pro	Ser	Ala	Val	Phe	Ser	Leu	Glu	Met
				195			200				205				
Ser	Lys	Glu	Gln	Leu	Val	Met	Arg	Leu	Leu	Ser	Met	Met	Ser	Glu	Val
				210			215			220					
Pro	Leu	Phe	Lys	Ile	Arg	Ser	Gly	Ser	Ile	Ser	Asn	Glu	Asp	Leu	Lys
				225			230			235			240		
Lys	Leu	Glu	Ala	Ser	Ala	Ile	Glu	Leu	Ala	Lys	Tyr	Asp	Ile	Tyr	Leu
				245			250				255				
Asp	Asp	Thr	Pro	Ala	Leu	Thr	Thr	Asp	Leu	Arg	Ile	Arg	Ala	Arg	
				260			265			270					
Lys	Leu	Arg	Lys	Glu	Lys	Glu	Val	Glu	Phe	Val	Ala	Val	Asp	Tyr	Leu
				275			280				285				
Gln	Leu	Leu	Arg	Pro	Pro	Val	Arg	Lys	Ser	Ser	Arg	Gln	Glu	Glu	Val
				290			295			300					
Ala	Glu	Val	Ser	Arg	Asn	Leu	Lys	Ala	Leu	Ala	Lys	Glu	Leu	His	Ile
				305			310			315			320		

Pro Val Met Ala Leu Ala Gln Leu Ser Arg Glu Val Glu Lys Arg Ser
 325 330 335

 Asp Lys Arg Pro Gln Leu Ala Asp Leu Arg Glu Ser Gly Gln Ile Glu
 340 345 350

 Gln Asp Ala Asp Leu Ile Leu Phe Leu His Arg Pro Glu Tyr Tyr Lys
 355 360 365

 Lys Lys Pro Asn Pro Glu Glu Gln Gly Ile Ala Glu Val Ile Ile Ala
 370 375 380

 Lys Gln Arg Gln Gly Pro Thr Asp Ile Val Lys Leu Ala Phe Ile Lys
 385 390 395 400

 Glu Tyr Thr Lys Phe Ala Asn Leu Glu Ala Leu Pro Glu Gln Pro Pro
 405 410 415

 Glu Glu Glu Glu Leu Ser Glu Ile Ile Glu Thr Gln Glu Asp Glu Gly
 420 425 430

 Phe Glu Asp Ile Asp Phe
 435

<210> 133
 <211> 1526
 <212> DNA
 <213> Aquifex aeolicus

<400> 133
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 tacttaaact tagagaaggtagttccaat tacagaacgaaactgtcccttcacccctgac 120
 gatacaccctcccttacgtgtctccaagt aaacaaaatat tcaagtgtttcggtgcggg 180
 gtagggggag acgcgataaa gttcgtttccctttacgagg acatctctaatttgaagcc 240
 gcccttgaacctgcacaaacgctacggaaagaaatttagacc ttgaaaagat atcaaaagac 300
 gaaaaggat acgtggctcttgacagggttgtgatttctacaggaaagccttctcaaa 360
 aacagagagg caagttagtgcgtaaagagt agggaaatagaccctaaagtacgcgaggaag 420
 ttgatcttgggtacgcacc ttccagtgaa gcactcgtaaaagtcttaaaagagaacgt 480
 cttagaggcttaccttga aactaaaaac ctccttctcctacgaagggtgttacagg 540
 gatcttttcctcggcgtgtcgtgatcccataaaaggatc cgagggaaag agttataggt 600
 ttccgtggaa ggaggatagt agaggacaaa tctcccaagtacataaactctccagacgc 660
 agggtatttaaaaaggggga gaacttattc ggtcttacg aggcaaagga gtatataaag 720
 gaagaaggat ttgcgataact tttggaaagggtactttgacc ttttgagact ttttccgag 780
 ggaataagga acgttggcaccctcggtacagccctgacccaaatca ggcaaacctc 840
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agactgataa acagctcagg ggagctctt gaaacgctca taaaaaccgc aaggaaaaac 1080
tttagggaga aaacgcgtga gttcaggtat tatctggct ttatttcgca tggagtaagg 1140
cgcttgctc tggcttcgga gttcacacc aagtacaaag ttcctatgga aattttatta 1200
atgaaaattt aaaaaattt ctaagaaaaa gaaattaaac tctcctttaa ggaaaaaatc 1260
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cctgagttaa aggaactcgc agttaacgcc ttaaacggag aggagcatc actccaaaa 1380
gaagttctcg agtaccaggt ggataacttg gagaaacttt ttaacaacat ccttagggat 1440
ttacaaaaat ctggaaaaa gaggaagaaa agagggttga aaaatgtaaa tacttaatta 1500
actttaataa attttagag ttagga 1526

<210> 134

<211> 498

<212> PRT

<213> Aquifex aeolicus

<400> 134

Met Ser Ser Asp Ile Asp Glu Leu Arg Arg Glu Ile Asp Ile Val Asp
1 5 10 15

Val Ile Ser Glu Tyr Leu Asn Leu Glu Lys Val Gly Ser Asn Tyr Arg
20 25 30

Thr Asn Cys Pro Phe His Pro Asp Asp Thr Pro Ser Phe Tyr Val Ser
35 40 45

Pro Ser Lys Gln Ile Phe Lys Cys Phe Gly Cys Gly Val Gly Gly Asp
50 55 60

Ala Ile Lys Phe Val Ser Leu Tyr Glu Asp Ile Ser Tyr Phe Glu Ala
65 70 75 80

Ala Leu Glu Leu Ala Lys Arg Tyr Gly Lys Lys Leu Asp Leu Glu Lys
85 90 95

Ile Ser Lys Asp Glu Lys Val Tyr Val Ala Leu Asp Arg Val Cys Asp
100 105 110

Phe Tyr Arg Glu Ser Leu Leu Lys Asn Arg Glu Ala Ser Glu Tyr Val
115 120 125

Lys Ser Arg Gly Ile Asp Pro Lys Val Ala Arg Lys Phe Asp Leu Gly
130 135 140

Tyr Ala Pro Ser Ser Glu Ala Leu Val Lys Val Leu Lys Glu Asn Asp
145 150 155 160

Leu Leu Glu Ala Tyr Leu Glu Thr Lys Asn Leu Leu Ser Pro Thr Lys

165	170	175
Gly Val Tyr Arg Asp Leu Phe Leu Arg Arg Val Val Ile Pro Ile Lys		
180	185	190
Asp Pro Arg Gly Arg Val Ile Gly Phe Gly Gly Arg Arg Ile Val Glu		
195	200	205
Asp Lys Ser Pro Lys Tyr Ile Asn Ser Pro Asp Ser Arg Val Phe Lys		
210	215	220
Lys Gly Glu Asn Leu Phe Gly Leu Tyr Glu Ala Lys Glu Tyr Ile Lys		
225	230	235
Glu Glu Gly Phe Ala Ile Leu Val Glu Gly Tyr Phe Asp Leu Leu Arg		
245	250	255
Leu Phe Ser Glu Gly Ile Arg Asn Val Val Ala Pro Leu Gly Thr Ala		
260	265	270
Leu Thr Gln Asn Gln Ala Asn Leu Leu Ser Lys Phe Thr Lys Lys Val		
275	280	285
Tyr Ile Leu Tyr Asp Gly Asp Asp Ala Gly Arg Lys Ala Met Lys Ser		
290	295	300
Ala Ile Pro Leu Leu Ser Ala Gly Val Glu Val Tyr Pro Val Tyr		
305	310	315
Leu Pro Glu Gly Tyr Asp Pro Asp Glu Phe Ile Lys Glu Phe Gly Lys		
325	330	335
Glu Glu Leu Arg Arg Leu Ile Asn Ser Ser Gly Glu Leu Phe Glu Thr		
340	345	350
Leu Ile Lys Thr Ala Arg Glu Asn Leu Glu Glu Lys Thr Arg Glu Phe		
355	360	365
Arg Tyr Tyr Leu Gly Phe Ile Ser Asp Gly Val Arg Arg Phe Ala Leu		
370	375	380
Ala Ser Glu Phe His Thr Lys Tyr Lys Val Pro Met Glu Ile Leu Leu		
385	390	395
Met Lys Ile Glu Lys Asn Ser Gln Glu Lys Glu Ile Lys Leu Ser Phe		
405	410	415
Lys Glu Lys Ile Phe Leu Lys Gly Leu Ile Glu Leu Lys Pro Lys Ile		

420 425 430

Asp Leu Glu Val Leu Asn Leu Ser Pro Glu Leu Lys Glu Leu Ala Val
435 440 445

Asn Ala Leu Asn Gly Glu Glu His Leu Leu Pro Lys Glu Val Leu Glu
450 455 460

Tyr Gln Val Asp Asn Leu Glu Lys Leu Phe Asn Asn Ile Leu Arg Asp
465 470 475 480

Leu Gln Lys Ser Gly Lys Lys Arg Lys Lys Arg Gly Leu Lys Asn Val
485 490 495

Asn Thr

<210> 135

<211> 705

<212> DNA

<213> Aquifex aeolicus

<400> 135

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atcccaaaga ggtactggaa cgccaactta gacacttacc accccaagaa cgtatcccag 180
aacagggcac ttttgacgt aagggtcttc gtccacaact tcaatcccga ggaagggaaa 240
ggccttacct ttgttagatc tcctggagtc ggcaaaaactc accttgcggg tgcaacatta 300
aaagcgattt atgagaagaa gggaatcaga ggataacttct tcgataacgaa ggatctaata 360
ttcaggttaa aacacttaat ggacgaggaa aaggatacaa agtttttaaa aactgtctta 420
aactcaccgg ttttggttct cgacgacctc ggttctgaga ggctcagtga ctggcagagg 480
gaactcatct cttacataat cacttacagg tataacaacc ttaagagcac gataataacc 540
acgaattact cactccagag ggaagaagag agtagcgtga ggataagtgc ggatcttgca 600
agcagactcg gagaaaacgt agttcaaaa attacgaga tgaacgagtt gctcgttata 660
aagggttccg acctcaggaa gtctaaaaag ctatcaaccc catct 705

<210> 136

<211> 235

<212> PRT

<213> Aquifex aeolicus

<400> 136

Met Gln Asp Thr Ala Thr Cys Ser Ile Cys Gln Gly Thr Gly Phe Val
1 5 10 15

Lys Thr Glu Asp Asn Lys Val Arg Leu Cys Glu Cys Arg Phe Lys Lys

20 25 30

Arg Asp Val Asn Arg Glu Leu Asn Ile Pro Lys Arg Tyr Trp Asn Ala
35 40 45

Asn Leu Asp Thr Tyr His Pro Lys Asn Val Ser Gln Asn Arg Ala Leu
50 55 60

Leu Thr Ile Arg Val Phe Val His Asn Phe Asn Pro Glu Glu Gly Lys
65 70 75 80

Gly Leu Thr Phe Val Gly Ser Pro Gly Val Gly Lys Thr His Leu Ala
85 90 95

Val Ala Thr Leu Lys Ala Ile Tyr Glu Lys Lys Gly Ile Arg Gly Tyr
100 105 110

Phe Phe Asp Thr Lys Asp Leu Ile Phe Arg Leu Lys His Leu Met Asp
115 120 125

Glu Gly Lys Asp Thr Lys Phe Leu Lys Thr Val Leu Asn Ser Pro Val
130 135 140

Leu Val Leu Asp Asp Leu Gly Ser Glu Arg Leu Ser Asp Trp Gln Arg
145 150 155 160

Glu Leu Ile Ser Tyr Ile Ile Thr Tyr Arg Tyr Asn Asn Leu Lys Ser
165 170 175

Thr Ile Ile Thr Thr Asn Tyr Ser Leu Gln Arg Glu Glu Ser Ser
180 185 190

Val Arg Ile Ser Ala Asp Leu Ala Ser Arg Leu Gly Glu Asn Val Val
195 200 205

Ser Lys Ile Tyr Glu Met Asn Glu Leu Leu Val Ile Lys Gly Ser Asp
210 215 220

Leu Arg Lys Ser Lys Lys Leu Ser Thr Pro Ser
225 230 235

<210> 137

<211> 4101

<212> DNA

<213> Thermatoga maritima

<400> 137

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cccgatgcag gtgtggttct cgttccgtg gaaaaattct ccgaagagat agaagacctt 120
gtgcgtttac tggagaagaa gacgcgggtt cgagtcatcg tgaacggtgt tcaaaaaagt 180
aacggggatc taaggggaaa gatactttcc cttctcaacg gtaatgtgcc ttacataaaa 240
gatgttgttt tcgaaggaaa caggctgatt ctgaaagtgc ttggagattt cgcgccggac 300
aggatgcct ccaaactcag aagcacgaaa aaacagctcg atgaactgct gcctcccgga 360
acagagatca tgctggaggt tggagccct ccgaaagatc tttgaaaaa ggaagtacca 420
caaccagaaa agagagaaga accaaagggt gaagaattga agatcgagga tgaaaaccac 480
atcttggac agaaacccag aaagatcgct ttcacccct caaaaatctt tgagtacaac 540
aaaaagacat cggtgaaggg caagatcttcaaaatagaga agatcgaggg gaaaagaacg 600
gtccttctga ttacccgtac agacggagaa gattctctga tctgcaaagt cttcaacgac 660
gttggaaaagg tcgaaggaaa agtatcggt ggagacgtga tcgttgccac aggagacctc 720
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agaagctact ctctggattt cgttggaaa aagctcgat tgggtccctt ccggcaccac 1500
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aagaagatcg gtatcagaa gctttcagaa atggagaagt tgaaggatac gatagactac 1620
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aaggttcg tcatgaccgg tggatgttcat ttccctcgatc ccgaagatgc caggggcaga 2040
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gtttccatga tcacgggagt gaagagaacg acgggtcagc acccaggggg gctcatgatc 2940
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 gtcaacaaaa atcacataga gctgatgaaa agcctgggtg ttctcgggaa ccttccagag 4080
 acggaacagt tcacgctttt c 4101

<210> 138

<211> 1367

<212> PRT

<213> Thermatoga maritima

<400> 138

Met	Lys	Lys	Ile	Glu	Asn	Leu	Lys	Trp	Lys	Asn	Val	Ser	Phe	Lys	Ser
1															10
															15

Leu	Glu	Ile	Asp	Pro	Asp	Ala	Gly	Val	Val	Leu	Val	Ser	Val	Glu	Lys
															20
															25
															30

Phe	Ser	Glu	Glu	Ile	Glu	Asp	Leu	Val	Arg	Leu	Leu	Glu	Lys	Lys	Thr
															35
															40
															45

Arg	Phe	Arg	Val	Ile	Val	Asn	Gly	Val	Gln	Lys	Ser	Asn	Gly	Asp	Leu
															50
															55
															60

Arg	Gly	Lys	Ile	Leu	Ser	Leu	Leu	Asn	Gly	Asn	Val	Pro	Tyr	Ile	Lys
															65
															70
															75
															80

Asp	Val	Val	Phe	Glu	Gly	Asn	Arg	Leu	Ile	Leu	Lys	Val	Leu	Gly	Asp
															85
															90
															95

Phe Ala Arg Asp Arg Ile Ala Ser Lys Leu Arg Ser Thr Lys Lys Gln

	100	105	110
Leu Asp Glu Leu Leu Pro Pro Gly Thr Glu Ile Met Leu Glu Val Val			
115	120	125	
Glu Pro Pro Glu Asp Leu Leu Lys Lys Glu Val Pro Gln Pro Glu Lys			
130	135	140	
Arg Glu Glu Pro Lys Gly Glu Glu Leu Lys Ile Glu Asp Glu Asn His			
145	150	155	160
Ile Phe Gly Gln Lys Pro Arg Lys Ile Val Phe Thr Pro Ser Lys Ile			
165	170	175	
Phe Glu Tyr Asn Lys Lys Thr Ser Val Lys Gly Lys Ile Phe Lys Ile			
180	185	190	
Glu Lys Ile Glu Gly Lys Arg Thr Val Leu Leu Ile Tyr Leu Thr Asp			
195	200	205	
Gly Glu Asp Ser Leu Ile Cys Lys Val Phe Asn Asp Val Glu Lys Val			
210	215	220	
Glu Gly Lys Val Ser Val Gly Asp Val Ile Val Ala Thr Gly Asp Leu			
225	230	235	240
Leu Leu Glu Asn Gly Glu Pro Thr Leu Tyr Val Lys Gly Ile Thr Lys			
245	250	255	
Leu Pro Glu Ala Lys Arg Met Asp Lys Ser Pro Val Lys Arg Val Glu			
260	265	270	
Leu His Ala His Thr Lys Phe Ser Asp Gln Asp Ala Ile Thr Asp Val			
275	280	285	
Asn Glu Tyr Val Lys Arg Ala Lys Glu Trp Gly Phe Pro Ala Ile Ala			
290	295	300	
Leu Thr Asp His Gly Asn Val Gln Ala Ile Pro Tyr Phe Tyr Asp Ala			
305	310	315	320
Ala Lys Glu Ala Gly Ile Lys Pro Ile Phe Gly Ile Glu Ala Tyr Leu			
325	330	335	
Val Ser Asp Val Glu Pro Val Ile Arg Asn Leu Ser Asp Asp Ser Thr			
340	345	350	
Phe Gly Asp Ala Thr Phe Val Val Leu Asp Phe Glu Thr Thr Gly Leu			

355	360	365
Asp Pro Gln Val Asp Glu Ile Ile Glu Ile Gly Ala Val Lys Ile Gln		
370	375	380
Gly Gly Gln Ile Val Asp Glu Tyr His Thr Leu Ile Lys Pro Ser Arg		
385	390	395
395 400		
Glu Ile Ser Arg Lys Ser Ser Glu Ile Thr Gly Ile Thr Gln Glu Met		
405	410	415
Leu Glu Asn Lys Arg Ser Ile Glu Glu Val Leu Pro Glu Phe Leu Gly		
420	425	430
Phe Leu Glu Asp Ser Ile Ile Val Ala His Asn Ala Asn Phe Asp Tyr		
435	440	445
Arg Phe Leu Arg Leu Trp Ile Lys Lys Val Met Gly Leu Asp Trp Glu		
450	455	460
460 465		
Arg Pro Tyr Ile Asp Thr Leu Ala Leu Ala Lys Ser Leu Leu Lys Leu		
465	470	475
475 480		
Arg Ser Tyr Ser Leu Asp Ser Val Val Glu Lys Leu Gly Leu Gly Pro		
485	490	495
495 500		
Phe Arg His His Arg Ala Leu Asp Asp Ala Arg Val Thr Ala Gln Val		
500	505	510
510 515		
Phe Leu Arg Phe Val Glu Met Met Lys Lys Ile Gly Ile Thr Lys Leu		
515	520	525
525 530		
Ser Glu Met Glu Lys Leu Lys Asp Thr Ile Asp Tyr Thr Ala Leu Lys		
530	535	540
540 545		
Pro Phe His Cys Thr Ile Leu Val Gln Asn Lys Lys Gly Leu Lys Asn		
545	550	555
555 560		
Leu Tyr Lys Leu Val Ser Asp Ser Tyr Ile Lys Tyr Phe Tyr Gly Val		
565	570	575
575 580		
Pro Arg Ile Leu Lys Ser Glu Leu Ile Glu Asn Arg Glu Gly Leu Leu		
580	585	590
590 595		
Val Gly Ser Ala Cys Ile Ser Gly Glu Leu Gly Arg Ala Ala Leu Glu		
595	600	605
605 610		
Gly Ala Ser Asp Ser Glu Leu Glu Glu Ile Ala Lys Phe Tyr Asp Tyr		

610	615	620
Ile Glu Val Met Pro Leu Asp Val Ile Ala Glu Asp Glu Glu Asp Leu		
625	630	635
Asp Arg Glu Arg Leu Lys Glu Val Tyr Arg Lys Leu Tyr Arg Ile Ala		
645	650	655
Lys Lys Leu Asn Lys Phe Val Val Met Thr Gly Asp Val His Phe Leu		
660	665	670
Asp Pro Glu Asp Ala Arg Gly Arg Ala Ala Leu Leu Ala Pro Gln Gly		
675	680	685
Asn Arg Asn Phe Glu Asn Gln Pro Ala Leu Tyr Leu Arg Thr Thr Glu		
690	695	700
Glu Met Leu Glu Lys Ala Ile Glu Ile Phe Glu Asp Glu Glu Ile Ala		
705	710	715
Arg Glu Val Val Ile Glu Asn Pro Asn Arg Ile Ala Asp Met Ile Glu		
725	730	735
Glu Val Gln Pro Leu Glu Lys Lys Leu His Pro Pro Ile Ile Glu Asn		
740	745	750
Ala Asp Glu Ile Val Arg Asn Leu Thr Met Lys Arg Ala Tyr Glu Ile		
755	760	765
Tyr Gly Asp Pro Leu Pro Glu Ile Val Gln Lys Arg Val Glu Lys Glu		
770	775	780
Leu Asn Ala Ile Ile Asn His Gly Tyr Ala Val Leu Tyr Leu Ile Ala		
785	790	795
Gln Glu Leu Val Gln Lys Ser Met Ser Asp Gly Tyr Val Val Gly Ser		
805	810	815
Arg Gly Ser Val Gly Ser Ser Leu Val Ala Asn Leu Leu Gly Ile Thr		
820	825	830
Glu Val Asn Pro Leu Pro Pro His Tyr Arg Cys Pro Glu Cys Lys Tyr		
835	840	845
Phe Glu Val Val Glu Asp Asp Arg Tyr Gly Ala Gly Tyr Asp Leu Pro		
850	855	860
Asn Lys Asn Cys Pro Arg Cys Gly Ala Pro Leu Arg Lys Asp Gly His		

865	870	875	880
Gly Ile Pro Phe Glu Thr Phe Met Gly Phe Glu Gly Asp Lys Val Pro			
885	890	895	
Asp Ile Asp Leu Asn Phe Ser Gly Glu Tyr Gln Glu Arg Ala His Arg			
900	905	910	
Phe Val Glu Glu Leu Phe Gly Lys Asp His Val Tyr Arg Ala Gly Thr			
915	920	925	
Ile Asn Thr Ile Ala Glu Arg Ser Ala Val Gly Tyr Val Arg Ser Tyr			
930	935	940	
Glu Glu Lys Thr Gly Lys Lys Leu Arg Lys Ala Glu Met Glu Arg Leu			
945	950	955	960
Val Ser Met Ile Thr Gly Val Lys Arg Thr Thr Gly Gln His Pro Gly			
965	970	975	
Gly Leu Met Ile Ile Pro Lys Asp Lys Glu Val Tyr Asp Phe Thr Pro			
980	985	990	
Ile Gln Tyr Pro Ala Asn Asp Arg Asn Ala Gly Val Phe Thr Thr His			
995	1000	1005	
Phe Ala Tyr Glu Thr Ile His Asp Asp Leu Val Lys Ile Asp Ala Leu			
1010	1015	1020	
Gly His Asp Asp Pro Thr Phe Ile Lys Met Leu Lys Asp Leu Thr Gly			
1025	1030	1035	1040
Ile Asp Pro Met Thr Ile Pro Met Asp Asp Pro Asp Thr Leu Ala Ile			
1045	1050	1055	
Phe Ser Ser Val Lys Pro Leu Gly Val Asp Pro Val Glu Leu Glu Ser			
1060	1065	1070	
Asp Val Gly Thr Tyr Gly Ile Pro Glu Phe Gly Thr Glu Phe Val Arg			
1075	1080	1085	
Gly Met Leu Val Glu Thr Arg Pro Lys Ser Phe Ala Glu Leu Val Arg			
1090	1095	1100	
Ile Ser Gly Leu Ser His Gly Thr Asp Val Trp Leu Asn Asn Ala Arg			
1105	1110	1115	1120
Asp Trp Ile Asn Leu Gly Tyr Ala Lys Leu Ser Glu Val Ile Ser Cys			

1125	1130	1135
Arg Asp Asp Ile Met Asn Phe Leu Ile His Lys Gly Met Glu Pro Ser		
1140	1145	1150
Leu Ala Phe Lys Ile Met Glu Asn Val Arg Lys Gly Lys Gly Ile Thr		
1155	1160	1165
Glu Glu Met Glu Ser Glu Met Arg Arg Leu Lys Val Pro Glu Trp Phe		
1170	1175	1180
Ile Glu Ser Cys Lys Arg Ile Lys Tyr Leu Phe Pro Lys Ala His Ala		
1185	1190	1195
Val Ala Tyr Val Ser Met Ala Phe Arg Ile Ala Tyr Phe Lys Val His		
1205	1210	1215
Tyr Pro Leu Gln Phe Tyr Ala Ala Tyr Phe Thr Ile Lys Gly Asp Gln		
1220	1225	1230
Phe Asp Pro Val Leu Val Leu Arg Gly Lys Glu Ala Ile Lys Arg Arg		
1235	1240	1245
Leu Arg Glu Leu Lys Ala Met Pro Ala Lys Asp Ala Gln Lys Lys Asn		
1250	1255	1260
Glu Val Ser Val Leu Glu Val Ala Leu Glu Met Ile Leu Arg Gly Phe		
1265	1270	1275
Ser Phe Leu Pro Pro Asp Ile Phe Lys Ser Asp Ala Lys Lys Phe Leu		
1285	1290	1295
Ile Glu Gly Asn Ser Leu Arg Ile Pro Phe Asn Lys Leu Pro Gly Leu		
1300	1305	1310
Gly Asp Ser Val Ala Glu Ser Ile Ile Arg Ala Arg Glu Glu Lys Pro		
1315	1320	1325
Phe Thr Ser Val Glu Asp Leu Met Lys Arg Thr Lys Val Asn Lys Asn		
1330	1335	1340
His Ile Glu Leu Met Lys Ser Leu Gly Val Leu Gly Asp Leu Pro Glu		
1345	1350	1355
Thr Glu Gln Phe Thr Leu Phe		
1365		

<210> 139
<211> 567
<212> DNA
<213> Thermatoga maritima

<400> 139
gtgctcgcca tgatatggaa cgacaccgtt ttttcgtcg tagacacaga aaccacggga 60
accgatccct ttgccggaga ccggatagtt gaaatagccg ctgttcgtt cttcaagggg 120
aagatctaca gaaacaaagc gtttactt ctcgtaatc ccagaataag aatccctgcg 180
ctgattcaga aagttcacgg tatcagcaac atggacatcg tggaagcgcc agacatggac 240
acagtttacg atctttcag ggattacgtg aagggAACGG tgctcgtt tcacaacgcc 300
aacttcgacc tcactttct ggatatgtg gcaaaggaaa cgggaaactt tccaataacg 360
aatccctaca tcgacacact cgatcttca gaagagatct ttggaaaggcc tcattcttc 420
aaatggctct ccgaaagact tggaaataaaa accacgatac ggcaccgtgc tcttccagat 480
gccctggta ccgcaagagt ttttgtgaag cttgttgaat ttcttggta aaacagggtc 540
aacgaattca tacgtggaaa acgggggg 567

<210> 140
<211> 189
<212> PRT
<213> Thermatoga maritima

<400> 140
Met Leu Ala Met Ile Trp Asn Asp Thr Val Phe Cys Val Val Asp Thr
1 5 10 15

Glu Thr Thr Gly Thr Asp Pro Phe Ala Gly Asp Arg Ile Val Glu Ile
20 25 30

Ala Ala Val Pro Val Phe Lys Gly Lys Ile Tyr Arg Asn Lys Ala Phe
35 40 45

His Ser Leu Val Asn Pro Arg Ile Arg Ile Pro Ala Leu Ile Gln Lys
50 55 60

Val His Gly Ile Ser Asn Met Asp Ile Val Glu Ala Pro Asp Met Asp
65 70 75 80

Thr Val Tyr Asp Leu Phe Arg Asp Tyr Val Lys Gly Thr Val Leu Val
85 90 95

Phe His Asn Ala Asn Phe Asp Leu Thr Phe Leu Asp Met Met Ala Lys
100 105 110

Glu Thr Gly Asn Phe Pro Ile Thr Asn Pro Tyr Ile Asp Thr Leu Asp
115 120 125

Leu Ser Glu Glu Ile Phe Gly Arg Pro His Ser Leu Lys Trp Leu Ser
130 135 140

Glu Arg Leu Gly Ile Lys Thr Thr Ile Arg His Arg Ala Leu Pro Asp
145 150 155 160

Ala Leu Val Thr Ala Arg Val Phe Val Lys Leu Val Glu Phe Leu Gly
165 170 175

Glu Asn Arg Val Asn Glu Phe Ile Arg Gly Lys Arg Gly
180 185

<210> 141

<211> 1434

<212> DNA

<213> Thermatoga maritima

<400> 141

gtggaagttc tttacaggaa gtacaggcca aagactttt ctgaggttgt caatcaggat 60
catgtgaaga aggcaataat cggtgctatt cagaagaaca gcgtggccca cggatacata 120
ttcgccggtc cgagggaaac ggggaagact actcttgcca gaattctcgc aaaatccctg 180
aactgtgaga acagaaaggg agttgaaccc tgcaattcct gcagagcctg cagagagata 240
gacgagggaa ctttcatgga cgtgatagag ctcgacgcgg cctccaacag aggaatagac 300
gagatcagaa gaatcagaga cgccgttgga tacaggccga tggaaaggtaa atacaaagtc 360
tacataatag acgaagttca catgctcacg aaagaagcct tcaacgcgcct cctcaaaaaca 420
ctcgaagaac ctccttccca cgtcgtgttc gtgctggcaa cgacaaacct tgagaaggtt 480
cctcccacga ttatctcgag atgtcaggtt ttcgagttca gaaacattcc cgacgagctc 540
atcgaaaaaga ggctccagga agttgcggag gctgaaggaa tagagataga cagggaaagct 600
ctgagcttca tcgcaaaaag agcctctgga ggcttgagag acgcgcctcac catgctcgag 660
caggtgtgga agttctcgga agggaaagata gatctcgaga cggtacacag ggcgctcgaa 720
ttgataccga tacaggttgt tccgcattac gtgaacgcta tctttctgg tgatgtgaaa 780
agggtcttca ccgttctcga cgacgtctat tacagcggga aggactacga ggtgctcatt 840
caggaagcag tcgaggatct ggtcgaagac ctggaaaggg agagagggtt ttaccaggtt 900
tcagcgaacg atatagttca gtttctgaga caacttctga atcttctcgag agagataaaag 960
ttcgccgaag aaaaacgact cgtctgtaaa gtgggttcgg cttacatagc gacgaggttc 1020
tccaccacaa acgttcaagga aaacgatgtc agagaaaaaa acgataattc aaatgtacag 1080
cagaaagaag agaagaaaga aacgggtgaag gcaaaaagaag aaaaacagga agacagcgg 1140
ttcgagaaac gcttcaaaga actcatggaa gaactgaaag aaaagggcga tctctctatc 1200
tttgcgtctc tcagcctctc agaggtgcag tttgacggag aaaaggtgat tatttcttt 1260
gattcatcga aagctatgca ttacgagttt atgaagaaaa aactgcctga gctggaaaac 1320
atttttcttca gaaaactcgg gaaaaaaagta gaagtgaac ttgcactgat gggaaaagaa 1380
gaaacaatcg agaaggtttc tcagaagatc ctgagattgt ttgaacagga ggg 1434

<210> 142

<211> 478

<212> PRT

<213> Thermatoga maritima

<400> 142

Met	Glu	Val	Leu	Tyr	Arg	Lys	Tyr	Arg	Pro	Lys	Thr	Phe	Ser	Glu	Val
1				5				10							15
Val	Asn	Gln	Asp	His	Val	Lys	Lys	Ala	Ile	Ile	Gly	Ala	Ile	Gln	Lys
	20					25							30		
Asn	Ser	Val	Ala	His	Gly	Tyr	Ile	Phe	Ala	Gly	Pro	Arg	Gly	Thr	Gly
	35					40						45			
Lys	Thr	Thr	Leu	Ala	Arg	Ile	Leu	Ala	Lys	Ser	Leu	Asn	Cys	Glu	Asn
	50				55				60						
Arg	Lys	Gly	Val	Glu	Pro	Cys	Asn	Ser	Cys	Arg	Ala	Cys	Arg	Glu	Ile
	65			70				75						80	
Asp	Glu	Gly	Thr	Phe	Met	Asp	Val	Ile	Glu	Leu	Asp	Ala	Ala	Ser	Asn
	85					90						95			
Arg	Gly	Ile	Asp	Glu	Ile	Arg	Arg	Ile	Arg	Asp	Ala	Val	Gly	Tyr	Arg
	100					105						110			
Pro	Met	Glu	Gly	Lys	Tyr	Lys	Val	Tyr	Ile	Ile	Asp	Glu	Val	His	Met
	115					120					125				
Leu	Thr	Lys	Glu	Ala	Phe	Asn	Ala	Leu	Leu	Lys	Thr	Leu	Glu	Glu	Pro
	130				135				140						
Pro	Ser	His	Val	Val	Phe	Val	Leu	Ala	Thr	Thr	Asn	Leu	Glu	Lys	Val
	145				150				155				160		
Pro	Pro	Thr	Ile	Ile	Ser	Arg	Cys	Gln	Val	Phe	Glu	Phe	Arg	Asn	Ile
		165				170						175			
Pro	Asp	Glu	Leu	Ile	Glu	Lys	Arg	Leu	Gln	Glu	Val	Ala	Glu	Ala	Glu
		180				185					190				
Gly	Ile	Glu	Ile	Asp	Arg	Glu	Ala	Leu	Ser	Phe	Ile	Ala	Lys	Arg	Ala
		195				200					205				
Ser	Gly	Gly	Leu	Arg	Asp	Ala	Leu	Thr	Met	Leu	Glu	Gln	Val	Trp	Lys
		210			215				220						
Phe	Ser	Glu	Gly	Lys	Ile	Asp	Leu	Glu	Thr	Val	His	Arg	Ala	Leu	Gly
	225				230			235				240			

Leu Ile Pro Ile Gln Val Val Arg Asp Tyr Val Asn Ala Ile Phe Ser
245 250 255

Gly Asp Val Lys Arg Val Phe Thr Val Leu Asp Asp Val Tyr Tyr Ser
260 265 270

Gly Lys Asp Tyr Glu Val Leu Ile Gln Glu Ala Val Glu Asp Leu Val
275 280 285

Glu Asp Leu Glu Arg Glu Arg Gly Val Tyr Gln Val Ser Ala Asn Asp
290 295 300

Ile Val Gln Val Ser Arg Gln Leu Leu Asn Leu Leu Arg Glu Ile Lys
305 310 315 320

Phe Ala Glu Glu Lys Arg Leu Val Cys Lys Val Gly Ser Ala Tyr Ile
325 330 335

Ala Thr Arg Phe Ser Thr Thr Asn Val Gln Glu Asn Asp Val Arg Glu
340 345 350

Lys Asn Asp Asn Ser Asn Val Gln Gln Lys Glu Glu Lys Lys Glu Thr
355 360 365

Val Lys Ala Lys Glu Glu Lys Gln Glu Asp Ser Glu Phe Glu Lys Arg
370 375 380

Phe Lys Glu Leu Met Glu Glu Leu Lys Glu Lys Gly Asp Leu Ser Ile
385 390 395 400

Phe Val Ala Leu Ser Leu Ser Glu Val Gln Phe Asp Gly Glu Lys Val
405 410 415

Ile Ile Ser Phe Asp Ser Ser Lys Ala Met His Tyr Glu Leu Met Lys
420 425 430

Lys Lys Leu Pro Glu Leu Glu Asn Ile Phe Ser Arg Lys Leu Gly Lys
435 440 445

Lys Val Glu Val Glu Leu Arg Leu Met Gly Lys Glu Glu Thr Ile Glu
450 455 460

Lys Val Ser Gln Lys Ile Leu Arg Leu Phe Glu Gln Glu Gly
465 470 475

<210> 143

<211> 1098

<212> DNA

<213> Thermatoga maritima

<400> 143

atgaaaagtaa ccgtcacgac tcttgaattt aaagacaaaa taaccatcgc ctcaaaagcg 60
ctcgaaaga aatccgtgaa acccattttt gctggatttc ttttcgaatg gaaagatgga 120
aatttctaca tctgcgcac cgatctcgag accggagtca aagcaaccgt gaatgccgt 180
gaaatctccg gtgaggcactt ttttggta ccaggagatg tcattcagaa gatggtaag 240
gttctcccac atgagataac ggaactttt tttagaggggg atgctctgt tataagttct 300
ggaaggcaccg ttttcaggat caccacatg cccgcggacg aatttccaga gataacgcct 360
gccgagtcgtg gaataacctt cgaagttgac acttcgctcc tcgaggaaat gggtgaaaag 420
gtcatcttcg ccgctgcca agacgagttc atgcgaaatc tgaatggagt tttctggaa 480
ctccacaaga atcttctcag gctggttgca agtgatggtt tcagacttcg acttgctgaa 540
gagcagatag aaaacgagga agaggcgagt ttcttgctt ctttgaagag catgaaagaa 600
gttcaaaaacg tgctggacaa cacaacggag ccgactataa ccgtgagta cgatggaaga 660
agggtttctc tgtcgacaaa tgatgttagaa acgggtgatga gagtggtcga cgctgaattt 720
cccgattaca aaagggtgat ccccgaaact ttcaaaacga aagtgggtgt ttccagaaaa 780
gaactcaggg aatcttgaa gagggtgatg gtgattgcca gcaagggaaag cgagtccgtg 840
aagttcgaaa tagaagaaaa cgttatgaga cttgtgagca agagccccga ttatggagaa 900
gtggtcgatg aagttgaagt tcaaaaagaa gggaaagatc tcgtgatgc ttcaacccg 960
aagttcatcg aggacgtttt gaagcacatt gagactgaag aaatcgaaat gaacttcgtt 1020
gattctacca gtccatgtca gataaatcca ctcgatattt ctggataacct ttacatagtg 1080
atgcccataca gactggca 1098

<210> 144

<211> 366

<212> PRT

<213> Thermatoga maritima

<400> 144

Met Lys Val Thr Val Thr Thr Leu Glu Leu Lys Asp Lys Ile Thr Ile

1

5

10

15

Ala Ser Lys Ala Leu Ala Lys Lys Ser Val Lys Pro Ile Leu Ala Gly

20

25

30

Phe Leu Phe Glu Val Lys Asp Gly Asn Phe Tyr Ile Cys Ala Thr Asp

35

40

45

Leu Glu Thr Gly Val Lys Ala Thr Val Asn Ala Ala Glu Ile Ser Gly

50

55

60

Glu Ala Arg Phe Val Val Pro Gly Asp Val Ile Gln Lys Met Val Lys

65

70

75

80

Val Leu Pro Asp Glu Ile Thr Glu Leu Ser Leu Glu Gly Asp Ala Leu

85

90

95

Val Ile Ser Ser Gly Ser Thr Val Phe Arg Ile Thr Thr Met Pro Ala
100 105 110

Asp Glu Phe Pro Glu Ile Thr Pro Ala Glu Ser Gly Ile Thr Phe Glu
115 120 125

Val Asp Thr Ser Leu Leu Glu Glu Met Val Glu Lys Val Ile Phe Ala
130 135 140

Ala Ala Lys Asp Glu Phe Met Arg Asn Leu Asn Gly Val Phe Trp Glu
145 150 155 160

Leu His Lys Asn Leu Leu Arg Leu Val Ala Ser Asp Gly Phe Arg Leu
165 170 175

Ala Leu Ala Glu Glu Gln Ile Glu Asn Glu Glu Glu Ala Ser Phe Leu
180 185 190

Leu Ser Leu Lys Ser Met Lys Glu Val Gln Asn Val Leu Asp Asn Thr
195 200 205

Thr Glu Pro Thr Ile Thr Val Arg Tyr Asp Gly Arg Arg Val Ser Leu
210 215 220

Ser Thr Asn Asp Val Glu Thr Val Met Arg Val Val Asp Ala Glu Phe
225 230 235 240

Pro Asp Tyr Lys Arg Val Ile Pro Glu Thr Phe Lys Thr Lys Val Val
245 250 255

Val Ser Arg Lys Glu Leu Arg Glu Ser Leu Lys Arg Val Met Val Ile
260 265 270

Ala Ser Lys Gly Ser Glu Ser Val Lys Phe Glu Ile Glu Glu Asn Val
275 280 285

Met Arg Leu Val Ser Lys Ser Pro Asp Tyr Gly Glu Val Val Asp Glu
290 295 300

Val Glu Val Gln Lys Glu Gly Glu Asp Leu Val Ile Ala Phe Asn Pro
305 310 315 320

Lys Phe Ile Glu Asp Val Leu Lys His Ile Glu Thr Glu Glu Ile Glu
325 330 335

Met Asn Phe Val Asp Ser Thr Ser Pro Cys Gln Ile Asn Pro Leu Asp
340 345 350

Ile Ser Gly Tyr Leu Tyr Ile Val Met Pro Ile Arg Leu Ala
355 360 365

<210> 145
<211> 972
<212> DNA
<213> *Thermatoga maritima*

<400> 145
atgccagtca cgtttctcac aggtactgca gaaactcaga aggaagaatt gataaagaaa 60
ctccctgaagg atggtaacgt ggagtacata aggatccatc cgaggatcc cgacaagatc 120
gatttcataa ggtctttact caggacaaag acgatcttt ccaacaagac gatcattgac 180
atcgtaatt tcgatgagtg gaaagcacag gagcagaagc gtctcggtga actttgaaa 240
aacgtaccgg aagacgttca tatcttcatc cggtctcaaa aaacaggtgg aaaggagta 300
gcgcgtggagc ttccgaagcc atgggaaacg gacaagtggc ttgagtgat agaaaaagcgc 360
ttcagggaga atggtttgct catcgataaa gatgccctc agctgtttt ctccaagggtt 420
ggaacgaacg acctgatcat agaaagggag attgaaaaac tgaagctta ttccgaggac 480
agaaagataa cgtagaaaga cgtggaaagag gtcgtttt cctatcagac tccgggatac 540
gatgatttt gcttgctgt ttccgaagga aaaaggaagc tcgctcaactc tcttctgtcg 600
cagctgtgga aaaccacaga gtccgtggtg attgccactg tccttgcgaa tcacttcttg 660
gatctttca aaatcctcgt tcttgtgaca aagaaaagat actacacctg gcctgtatgt 720
tccagggtgt ccaaagagct gggaaattccc gttcctcggt tggtctgtt cctcggttcc 780
tcctttaaga cctggaaatt caaggtgatg aaccacctcc tctactacga tgtgaagaag 840
gttagaaaga tactgagggta tctctacgt ctggacagag ccgtgaaaag cgaagaagat 900
ccaaaaccgt tcttccacga gttcatagaa gaggtggcac tggatgtata ttctcttcag 960
agagatgaag aa 972

<210> 146
<211> 324
<212> PRT
<213> *Thermatoga maritima*

<400> 146
Met Pro Val Thr Phe Leu Thr Gly Thr Ala Glu Thr Gln Lys Glu Glu
1 5 10 15

Leu Ile Lys Lys Leu Leu Lys Asp Gly Asn Val Glu Tyr Ile Arg Ile
20 25 30

His Pro Glu Asp Pro Asp Lys Ile Asp Phe Ile Arg Ser Leu Leu Arg
35 40 45

Thr Lys Thr Ile Phe Ser Asn Lys Thr Ile Ile Ile Asp Ile Val Asn Phe
50 55 60

Asp	Glu	Trp	Lys	Ala	Gln	Glu	Gln	Lys	Arg	Leu	Val	Glu	Leu	Leu	Lys
65															80
Asn	Val	Pro	Glu	Asp	Val	His	Ile	Phe	Ile	Arg	Ser	Gln	Lys	Thr	Gly
85															95
Gly	Lys	Gly	Val	Ala	Leu	Glu	Leu	Pro	Lys	Pro	Trp	Glu	Thr	Asp	Lys
100															110
Trp	Leu	Glu	Trp	Ile	Glu	Lys	Arg	Phe	Arg	Glu	Asn	Gly	Leu	Leu	Ile
115															125
Asp	Lys	Asp	Ala	Leu	Gln	Leu	Phe	Phe	Ser	Lys	Val	Gly	Thr	Asn	Asp
130															140
Leu	Ile	Ile	Glu	Arg	Glu	Ile	Glu	Lys	Leu	Lys	Ala	Tyr	Ser	Glu	Asp
145															160
Arg	Lys	Ile	Thr	Val	Glu	Asp	Val	Glu	Val	Val	Phe	Thr	Tyr	Gln	
165															175
Thr	Pro	Gly	Tyr	Asp	Asp	Phe	Cys	Phe	Ala	Val	Ser	Glu	Gly	Lys	Arg
180															190
Lys	Leu	Ala	His	Ser	Leu	Leu	Ser	Gln	Leu	Trp	Lys	Thr	Thr	Glu	Ser
195															205
Val	Val	Ile	Ala	Thr	Val	Leu	Ala	Asn	His	Phe	Leu	Asp	Leu	Phe	Lys
210															220
Ile	Leu	Val	Leu	Val	Thr	Lys	Lys	Arg	Tyr	Tyr	Thr	Trp	Pro	Asp	Val
225															240
Ser	Arg	Val	Ser	Lys	Glu	Leu	Gly	Ile	Pro	Val	Pro	Arg	Val	Ala	Arg
245															255
Phe	Leu	Gly	Phe	Ser	Phe	Lys	Thr	Trp	Lys	Phe	Lys	Val	Met	Asn	His
260															270
Leu	Leu	Tyr	Tyr	Asp	Val	Lys	Lys	Val	Arg	Lys	Ile	Leu	Arg	Asp	Leu
275															285
Tyr	Asp	Leu	Asp	Arg	Ala	Val	Lys	Ser	Glu	Glu	Asp	Pro	Lys	Pro	Phe
290															300
Phe	His	Glu	Phe	Ile	Glu	Glu	Val	Ala	Leu	Asp	Val	Tyr	Ser	Leu	Gln
305															320

Arg Asp Glu Glu

<210> 147
<211> 936
<212> DNA
<213> Thermatoga maritima

<400> 147

atgaacgatt tgatcagaaa gtacgctaaa gatcaactgg aaactttgaa aaggatcata 60
gaaaagtctg aaggaatatac catcctcata aatggagaag atctctcgta tccgagagaa 120
gtatcccttg aacttcccga gtacgtggag aaattcccc cgaaggcctc ggatgttctg 180
gagatagatc ccgaggggga gaacataggc atagacgaca tcagaacgat aaaggacttc 240
ctgaactaca gccccgagct ctacacgaga aagtacgtga tagtccacga ctgtgaaaga 300
atgaccgcg aggccggcga cgcgtttctg aaggcccttg aagaaccacc agaatacgct 360
gtgatcggtc tgaacactcg cgcgtggcat tatctactgc cgacgataaa gagccgagtg 420
ttcagagtgg ttgtgaacgt tccaaaggag ttcagagatc tcgtgaaaga gaaaatagga 480
gatctctggg aggaacttcc acttcttgag agagacttca aaacggctct cgaagcctac 540
aaacttggtg cggaaaaact ttctggattt atggaaagtc tcaaagttt ggagacggaa 600
aaactcttga aaaaggcct ttcaaaaggc ctcgaagggtt atctcgcatg tagggagctc 660
ctggagagat tttcaaagggt ggaatcgaag gaattcttg cgcttttga tcaggtgact 720
aacacgataa cagaaaaaga cgcgtttctt ttgatccaga gactgacaag aatcattctc 780
cacgaaaaca catggaaag cggtgaagat caaaaaagcg tgtcttcct cgattcaatt 840
ctcagggtga agatagcga tctgaacaac aaactcactc tgatgaacat cctcgcgata 900
cacagagaga gaaagagagg tgtcaacgct tggagc 936

<210> 148
<211> 311
<212> PRT
<213> Thermatoga maritima

<400> 148

Met Asn Asp Leu Ile Arg Lys Tyr Ala Lys Asp Gln Leu Glu Thr Leu
1 5 10 15

Lys Arg Ile Ile Glu Lys Ser Glu Gly Ile Ser Ile Leu Ile Asn Gly
20 25 30

Glu Asp Leu Ser Tyr Pro Arg Glu Val Ser Leu Glu Leu Pro Glu Tyr
35 40 45

Val Glu Lys Phe Pro Pro Lys Ala Ser Asp Val Leu Glu Ile Asp Pro
50 55 60

Glu Gly Glu Asn Ile Gly Ile Asp Asp Ile Arg Thr Ile Lys Asp Phe
65 70 75 80

Leu Asn Tyr Ser Pro Glu Leu Tyr Thr Arg Lys Tyr Val Ile Val His
85 90 95

Asp Cys Glu Arg Met Thr Gln Gln Ala Ala Asn Ala Phe Leu Lys Ala
100 105 110

Leu Glu Glu Pro Pro Glu Tyr Ala Val Ile Val Leu Asn Thr Arg Arg
115 120 125

Trp His Tyr Leu Leu Pro Thr Ile Lys Ser Arg Val Phe Arg Val Val
130 135 140

Val Asn Val Pro Lys Glu Phe Arg Asp Leu Val Lys Glu Lys Ile Gly
145 150 155 160

Asp Leu Trp Glu Glu Leu Pro Leu Leu Glu Arg Asp Phe Lys Thr Ala
165 170 175

Leu Glu Ala Tyr Lys Leu Gly Ala Glu Lys Leu Ser Gly Leu Met Glu
180 185 190

Ser Leu Lys Val Leu Glu Thr Glu Lys Leu Leu Lys Lys Val Leu Ser
195 200 205

Lys Gly Leu Glu Gly Tyr Leu Ala Cys Arg Glu Leu Leu Glu Arg Phe
210 215 220

Ser Lys Val Glu Ser Lys Glu Phe Phe Ala Leu Phe Asp Gln Val Thr
225 230 235 240

Asn Thr Ile Thr Gly Lys Asp Ala Phe Leu Leu Ile Gln Arg Leu Thr
245 250 255

Arg Ile Ile Leu His Glu Asn Thr Trp Glu Ser Val Glu Asp Lys Ser
260 265 270

Val Ser Phe Leu Asp Ser Ile Leu Arg Val Lys Ile Ala Asn Leu Asn
275 280 285

Asn Lys Leu Thr Leu Met Asn Ile Leu Ala Ile His Arg Glu Arg Lys
290 295 300

Arg Gly Val Asn Ala Trp Ser
305 310

<210> 149

<211> 423
<212> DNA
<213> Thermatoga maritima

<400> 149
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tacacgctca gcggaaactcc agtcaccacc ttcaccatag cggtgacac ggttcccaga 120
aagaacgcgc cggacgacgc tcaaaccgact gatttctca ggatcgtcac ctggaaaga 180
ctggcagagt tcgctagaac ctatctcacc aaaggaaaggc tcggtctcggt cgaagggtgaa 240
atgagaatga gaagatgggaa acacccact ggagaaaaga gggtatctcc ggaggttgc 300
gcaaacgttg ttagattcat ggacagaaaa cctgctgaaa cagtttagcga gactgaagag 360
gagctggaaa taccggaaaga agactttcc agcgataacct tcagtgaaga tgaaccacca 420
ttt 423

<210> 150
<211> 141
<212> PRT
<213> Thermatoga maritima

<400> 150
Met Ser Phe Phe Asn Lys Ile Ile Leu Ile Gly Arg Leu Val Arg Asp
1 5 10 15

Pro Glu Glu Arg Tyr Thr Leu Ser Gly Thr Pro Val Thr Thr Phe Thr
20 25 30

Ile Ala Val Asp Arg Val Pro Arg Lys Asn Ala Pro Asp Asp Ala Gln
35 40 45

Thr Thr Asp Phe Phe Arg Ile Val Thr Phe Gly Arg Leu Ala Glu Phe
50 55 60

Ala Arg Thr Tyr Leu Thr Lys Gly Arg Leu Val Leu Val Glu Gly Glu
65 70 75 80

Met Arg Met Arg Arg Trp Glu Thr Pro Thr Gly Glu Lys Arg Val Ser
85 90 95

Pro Glu Val Val Ala Asn Val Val Arg Phe Met Asp Arg Lys Pro Ala
100 105 110

Glu Thr Val Ser Glu Thr Glu Glu Leu Glu Ile Pro Glu Glu Asp
115 120 125

Phe Ser Ser Asp Thr Phe Ser Glu Asp Glu Pro Pro Phe
130 135 140

<210> 151
<211> 1353
<212> DNA
<213> Thermatoga maritima

<400> 151
atgcgtgttc cccgcacaa cttagaggcc gaagttgctg tgctcgaaag catattgata 60
gatccgtcg taataaacga cgttttgaa atttgagcc acgaagattt ctatctgaaa 120
aaacaccaac acatcttcag agcgatggaa gagctttacg acgaaggaaa accgggtggac 180
gtggtttccg tctgtacaa gcttcaaagc atggaaaaac tcgaggaagt aggtggagat 240
ctgaaagtgg cccagctcgc tgaggctgtg cccagttctg cacacgcact tcactacgcg 300
gagatcgtca agaaaaatc cattctgagg aaactcattt agatctccag aaaaatctca 360
gaaaagtgcct acatgaaaga agatgtggag atcctgctcg acaacgcaga aaagatgatc 420
ttcgagatct cagagatgaa aacgacaaaaa tcctacgatc atctgagagg catcatgcac 480
cggtgttttggaaaccccttggaaacttcagg gaaagagcca accttataga acccggtgtg 540
ctcataacgg gactaccaac gggattcaaa agtctggaca aacagaccac aggttccac 600
agctccgatc tgggtataat agcagcgaga ccctccatgg gaaaaaccccttcc 660
tcaatagcga ggaacatggc tgtcaatttc gaaatccccg tcgaaatattt cagtctcgag 720
atgtccaaagg aacagctcgc tcaaagacta ctcagcatgg agtccgggtgt ggatctttac 780
agcatcagaa caggataacctt ggatcaggag aagtggaaa gactcacaat agcggcttct 840
aaactctaca aagcacccat agttgtggac gatgagtcac tcctcgatcc gcgatcggtt 900
agggcaaaag cgagaaggat gaaaaaagaa tacgatgtaa aagccatattt tggactat 960
ctccagctca tgcaccccttggaa aggaagaaaa gaaagcagac agcaggagat atccgagatc 1020
tcgagatctc tgaagctcct tgcggggaa ctcgacatag tgggtatacg gcttcacag 1080
cttcgaggg ccgtagaaca gagagaagac aaaagaccga ggctgagtgaa cctcaggaa 1140
tccgggtgcga tagaacagga cgcagacaca gtcatcttca tctacagggaa ggaatattac 1200
aggagcaaaa aatccaaaga ggaaagcaag cttcacgaac ctcacgaac tgaaatcata 1260
ataggttaaac agagaaacgg tcccgttgaa acgatcactc tgatcttgcg cccagaacg 1320
gttacgttcc atgaagtcga tgggtgcatttca 1353

<210> 152
<211> 451
<212> PRT
<213> Thermatoga maritima

<400> 152
Met Arg Val Pro Pro His Asn Leu Glu Ala Glu Val Ala Val Leu Gly
1 5 10 15

Ser Ile Leu Ile Asp Pro Ser Val Ile Asn Asp Val Leu Glu Ile Leu
20 25 30

Ser His Glu Asp Phe Tyr Leu Lys Lys His Gln His Ile Phe Arg Ala
35 40 45

Met Glu Glu Leu Tyr Asp Glu Gly Lys Pro Val Asp Val Val Ser Val

50

55

60

Cys Asp Lys Leu Gln Ser Met Gly Lys Leu Glu Glu Val Gly Gly Asp
 65 70 75 80

Leu Glu Val Ala Gln Leu Ala Glu Ala Val Pro Ser Ser Ala His Ala
 85 90 95

Leu His Tyr Ala Glu Ile Val Lys Glu Lys Ser Ile Leu Arg Lys Leu
 100 105 110

Ile Glu Ile Ser Arg Lys Ile Ser Glu Ser Ala Tyr Met Glu Glu Asp
 115 120 125

Val Glu Ile Leu Leu Asp Asn Ala Glu Lys Met Ile Phe Glu Ile Ser
 130 135 140

Glu Met Lys Thr Thr Lys Ser Tyr Asp His Leu Arg Gly Ile Met His
 145 150 155 160

Arg Val Phe Glu Asn Leu Glu Asn Phe Arg Glu Arg Ala Asn Leu Ile
 165 170 175

Glu Pro Gly Val Leu Ile Thr Gly Leu Pro Thr Gly Phe Lys Ser Leu
 180 185 190

Asp Lys Gln Thr Thr Gly Phe His Ser Ser Asp Leu Val Ile Ile Ala
 195 200 205

Ala Arg Pro Ser Met Gly Lys Thr Ser Phe Ala Leu Ser Ile Ala Arg
 210 215 220

Asn Met Ala Val Asn Phe Glu Ile Pro Val Gly Ile Phe Ser Leu Glu
 225 230 235 240

Met Ser Lys Glu Gln Leu Ala Gln Arg Leu Leu Ser Met Glu Ser Gly
 245 250 255

Val Asp Leu Tyr Ser Ile Arg Thr Gly Tyr Leu Asp Gln Glu Lys Trp
 260 265 270

Glu Arg Leu Thr Ile Ala Ala Ser Lys Leu Tyr Lys Ala Pro Ile Val
 275 280 285

Val Asp Asp Glu Ser Leu Leu Asp Pro Arg Ser Leu Arg Ala Lys Ala
 290 295 300

Arg Arg Met Lys Lys Glu Tyr Asp Val Lys Ala Ile Phe Val Asp Tyr

305	310	315	320
Leu Gln Leu Met His Leu Lys Gly Arg Lys Glu Ser Arg Gln Gln Glu			
325		330	335
Ile Ser Glu Ile Ser Arg Ser Leu Lys Leu Leu Ala Arg Glu Leu Asp			
340	345	350	
Ile Val Val Ile Ala Leu Ser Gln Leu Ser Arg Ala Val Glu Gln Arg			
355	360	365	
Glu Asp Lys Arg Pro Arg Leu Ser Asp Leu Arg Glu Ser Gly Ala Ile			
370	375	380	
Glu Gln Asp Ala Asp Thr Val Ile Phe Ile Tyr Arg Glu Glu Tyr Tyr			
385	390	395	400
Arg Ser Lys Lys Ser Lys Glu Glu Ser Lys Leu His Glu Pro His Glu			
405	410	415	
Ala Glu Ile Ile Ile Gly Lys Gln Arg Asn Gly Pro Val Gly Thr Ile			
420	425	430	
Thr Leu Ile Phe Asp Pro Arg Thr Val Thr Phe His Glu Val Asp Val			
435	440	445	
Val His Ser			
450			

<210> 153
 <211> 1695
 <212> DNA
 <213> Thermatoga maritima

<400> 153
 gtgattcctc gagaggtcat cgagggaaata aaagaaaaagg ttgacatcgt agaggtcatt 60
 tccgagtacg tgaatcttac ccgggttaggt tcctcctaca gggctctctg tccctttcat 120
 tcagaaacca atccttcttt ctacgttcat ccgggtttga agatatacca ttgtttcgcc 180
 tgcggtgcgaa gtggagacgt catcaaattt cttcaagaaa tggaaagggt cagtttccag 240
 gaagcgctgg aaagacttgc caaaagagct gggattgatc tttctctcta cagaacagaa 300
 gggacttctg aatacgaaa atacattcgt ttgtacgaag aaacgtggaa aaggtaatgtc 360
 aaagagctgg agaaatcgaa agaggcaaaa gactattaa aaagcagagg cttctctgaa 420
 gaagatatacg caaagttcgg cttgggtac gtccccaaaga gatccagcat ctctatagaa 480
 gttcagaag gcatgaacat aacactggaa gaacttgtca gatacggat cgcgctgaaa 540
 aagggtgatc gattcgttga tagattcgaa ggaagaatcg ttgttccaat aaagaacgac 600
 agtggtcata ttgtggcttt tggtggcgt gctctcggca acgaagaacc gaagtatttg 660
 aactctccag agaccaggtt aaaaaatccctt cgtatggcg 720

aaaaaaagtgg caaaagaggt tggtttttc gtcacaccg aaggctactt cgacgcgctc 780
gcattcagaa agatggaaat accaacggcg gtcgctgttc ttggggcgag tcttcaaga 840
gaggcgattc taaaacttgc ggcgtattcg aaaaacgtca tactgtgtt cgataatgac 900
aaagcaggct tcagagccac tctcaaattcc ctcgaggatc tccttagacta cgaattcaac 960
gtgcttgtgg caaccccctc tccttacaaa gaccagatg aactcttca gaaagaagga 1020
gaaggttcat tgaaaaagat gctgaaaaac tcgcgttgcg tgcataattt tctggtgacg 1080
gctggtgagg tcttcttgc caggaacagc cccgcgggtg tgagatccta ccttcttgc 1140
ctcaaagggtt gggccaaaaa gatgagaagg aaaggatatt taaaacacat agaaaatctc 1200
gtgaatgagg tttcatcttc tctccagata ccagaaaaacc agatttgcg ctttttgcg 1260
agcgacaggt ctaacactat gcctgttcat gagaccaagt cgtcaaaagggtt acgtatgag 1320
gggagaggac tggcttattt gttttgcg tacgaggatt tgagggaaaa gattctggaa 1380
ctggacttag aggtactgga agataaaaac gcgagggagt tttcaagag agtctcaactg 1440
ggagaagatt tgaacaaagt catagaaaaac ttcccaaaag agctgaaaga ctggatttt 1500
gagacaatag aaagcattcc tcctccaaag gatcccgaga aattcctcgg tgacctctcc 1560
gaaaagttga aaatccgacg gatagagaga cgtatcgcag aaatagatga tatgataaaag 1620
aaagctcaa acgatgaaga aaggcgtt cttctctca taaaagtgaa tctccatcaga 1680
aaaataaaaga ggagg 1695

<210> 154

<211> 565

<212> PRT

<213> *Thermatoga maritima*

<400> 154

Met	Ile	Pro	Arg	Glu	Val	Ile	Glu	Glu	Ile	Lys	Glu	Lys	Val	Asp	Ile
1		5							10					15	

Val	Glu	Val	Ile	Ser	Glu	Tyr	Val	Asn	Leu	Thr	Arg	Val	Gly	Ser	Ser
									20				25		30

Tyr	Arg	Ala	Leu	Cys	Pro	Phe	His	Ser	Glu	Thr	Asn	Pro	Ser	Phe	Tyr
									35				40		45

Val	His	Pro	Gly	Leu	Lys	Ile	Tyr	His	Cys	Phe	Gly	Cys	Gly	Ala	Ser
									50			55		60	

Gly	Asp	Val	Ile	Lys	Phe	Leu	Gln	Glu	Met	Glu	Gly	Ile	Ser	Phe	Gln	
									65			70		75		80

Glu	Ala	Leu	Glu	Arg	Leu	Ala	Lys	Arg	Ala	Gly	Ile	Asp	Leu	Ser	Leu
									85			90		95	

Tyr	Arg	Thr	Glu	Gly	Thr	Ser	Glu	Tyr	Gly	Lys	Tyr	Ile	Arg	Leu	Tyr
									100			105		110	

Glu	Glu	Thr	Trp	Lys	Arg	Tyr	Val	Lys	Glu	Leu	Glu	Lys	Ser	Lys	Glu
									115			120		125	

Ala Lys Asp Tyr Leu Lys Ser Arg Gly Phe Ser Glu Glu Asp Ile Ala
130 135 140

Lys Phe Gly Phe Gly Tyr Val Pro Lys Arg Ser Ser Ile Ser Ile Glu
145 150 155 160

Val Ala Glu Gly Met Asn Ile Thr Leu Glu Glu Leu Val Arg Tyr Gly
165 170 175

Ile Ala Leu Lys Lys Gly Asp Arg Phe Val Asp Arg Phe Glu Gly Arg
180 185 190

Ile Val Val Pro Ile Lys Asn Asp Ser Gly His Ile Val Ala Phe Gly
195 200 205

Gly Arg Ala Leu Gly Asn Glu Glu Pro Lys Tyr Leu Asn Ser Pro Glu
210 215 220

Thr Arg Tyr Phe Ser Lys Lys Thr Leu Phe Leu Phe Asp Glu Ala
225 230 235 240

Lys Lys Val Ala Lys Glu Val Gly Phe Phe Val Ile Thr Glu Gly Tyr
245 250 255

Phe Asp Ala Leu Ala Phe Arg Lys Asp Gly Ile Pro Thr Ala Val Ala
260 265 270

Val Leu Gly Ala Ser Leu Ser Arg Glu Ala Ile Leu Lys Leu Ser Ala
275 280 285

Tyr Ser Lys Asn Val Ile Leu Cys Phe Asp Asn Asp Lys Ala Gly Phe
290 295 300

Arg Ala Thr Leu Lys Ser Leu Glu Asp Leu Leu Asp Tyr Glu Phe Asn
305 310 315 320

Val Leu Val Ala Thr Pro Ser Pro Tyr Lys Asp Pro Asp Glu Leu Phe
325 330 335

Gln Lys Glu Gly Glu Gly Ser Leu Lys Lys Met Leu Lys Asn Ser Arg
340 345 350

Ser Phe Glu Tyr Phe Leu Val Thr Ala Gly Glu Val Phe Phe Asp Arg
355 360 365

Asn Ser Pro Ala Gly Val Arg Ser Tyr Leu Ser Phe Leu Lys Gly Trp
370 375 380

Val Gln Lys Met Arg Arg Lys Gly Tyr Leu Lys His Ile Glu Asn Leu
385 390 395 400

Val Asn Glu Val Ser Ser Ser Leu Gln Ile Pro Glu Asn Gln Ile Leu
405 410 415

Asn Phe Phe Glu Ser Asp Arg Ser Asn Thr Met Pro Val His Glu Thr
420 425 430

Lys Ser Ser Lys Val Tyr Asp Glu Gly Arg Gly Leu Ala Tyr Leu Phe
435 440 445

Leu Asn Tyr Glu Asp Leu Arg Glu Lys Ile Leu Glu Leu Asp Leu Glu
450 455 460

Val Leu Glu Asp Lys Asn Ala Arg Glu Phe Phe Lys Arg Val Ser Leu
465 470 475 480

Gly Glu Asp Leu Asn Lys Val Ile Glu Asn Phe Pro Lys Glu Leu Lys
485 490 495

Asp Trp Ile Phe Glu Thr Ile Glu Ser Ile Pro Pro Pro Lys Asp Pro
500 505 510

Glu Lys Phe Leu Gly Asp Leu Ser Glu Lys Leu Lys Ile Arg Arg Ile
515 520 525

Glu Arg Arg Ile Ala Glu Ile Asp Asp Met Ile Lys Lys Ala Ser Asn
530 535 540

Asp Glu Glu Arg Arg Leu Leu Leu Ser Met Lys Val Asp Leu Leu Arg
545 550 555 560

Lys Ile Lys Arg Arg
565

<210> 155
<211> 804
<212> DNA
<213> Thermus thermophilus

<400> 155
atggctctac acccggctca ccctggggca ataatcggtc acgaggccgt ttcgcgcctc 60
cttccccgcc tcaccggcca gaccctgctc ttctccggcc ccgaggggggt ggggcggcgc 120
accgtggccc gctggtaacgc ctgggggctc aaccggcgct tccccccgcc ctccctgggg 180
gagcacccgg acgtcctcga ggtggggccc aaggccccggg acctccgggg ccggggccgag 240

gtgcggctgg aggaggtggc gcccctttg gagtggtgct ccagccaccc ccgggagcgg 300
gtgaagggtgg ccatccttgg a ctcggcccac ctccctcaccg aggccgcccc caacgcctc 360
ctcaagctcc tggaggagcc cccttcctac gcccgcacg tcctcatcg cccaaagccgc 420
gccaccctcc tccccaccct ggccctccgg gccacggagg tggcattcg ccccggtgccc 480
gaggaggccc tgcgcgcct cacccaggac ccggagctcc tccgctacgc cgccggggcc 540
ccgggcccgc tccttagggc cctccaggac ccggagggtt accgggcccgc catggccagg 600
gcgcaaaggg tcctgaaagc cccgcccctg gagcgcctcg ctttgcttcg ggagctttg 660
gccgaggagg agggggtcca cgcgcctccac ggcgtcctaa agcgcggga gcacctcctt 720
gcctggagc gggcgccgggaa ggccctggag ggtaactgtga gccccgagct ggtcctcgcc 780
cgctggcct tagactttaga gaca 804

<210> 156

<211> 268

<212> PRT

<213> Thermus thermophilus

<400> 156

Met Ala Leu His Pro Ala His Pro Gly Ala Ile Ile Gly His Glu Ala
1 5 10 15

Val Leu Ala Leu Leu Pro Arg Leu Thr Ala Gln Thr Leu Leu Phe Ser
20 25 30

Gly Pro Glu Gly Val Gly Arg Arg Thr Val Ala Arg Trp Tyr Ala Trp
35 40 45

Gly Leu Asn Arg Gly Phe Pro Pro Pro Ser Leu Gly Glu His Pro Asp
50 55 60

Val Leu Glu Val Gly Pro Lys Ala Arg Asp Leu Arg Gly Arg Ala Glu
65 70 75 80

Val Arg Leu Glu Glu Val Ala Pro Leu Leu Glu Trp Cys Ser Ser His
85 90 95

Pro Arg Glu Arg Val Lys Val Ala Ile Leu Asp Ser Ala His Leu Leu
100 105 110

Thr Glu Ala Ala Ala Asn Ala Leu Leu Lys Leu Leu Glu Glu Pro Pro
115 120 125

Ser Tyr Ala Arg Ile Val Leu Ile Ala Pro Ser Arg Ala Thr Leu Leu
130 135 140

Pro Thr Leu Ala Ser Arg Ala Thr Glu Val Ala Phe Ala Pro Val Pro
145 150 155 160

Glu Glu Ala Leu Arg Ala Leu Thr Gln Asp Pro Glu Leu Leu Arg Tyr
165 170 175

Ala Ala Gly Ala Pro Gly Arg Leu Leu Arg Ala Leu Gln Asp Pro Glu
180 185 190

Gly Tyr Arg Ala Arg Met Ala Arg Ala Gln Arg Val Leu Lys Ala Pro
195 200 205

Pro Leu Glu Arg Leu Ala Leu Leu Arg Glu Leu Leu Ala Glu Glu Glu
210 215 220

Gly Val His Ala Leu His Ala Val Leu Lys Arg Pro Glu His Leu Leu
225 230 235 240

Ala Leu Glu Arg Ala Arg Glu Ala Leu Glu Gly Tyr Val Ser Pro Glu
245 250 255

Leu Val Leu Ala Arg Leu Ala Leu Asp Leu Glu Thr
260 265

<210> 157

<211> 729

<212> DNA

<213> Thermus thermophilus

<400> 157

atgctggacc tgagggaggt gggggaggcg gagtggaaagg ccctaaagcc cctttggaa 60
agcgtccccg agggcgcccc cgtcctccctc ctggacccta agccaagcccc ctcccgggcg 120
gccttctacc ggaaccggga aaggcgggac ttcccccaccc ccaaggggaa ggacctggtg 180
cgcacctgg aaaaccgggc caagcgccctg gggctcaggg tccccggcgg ggtggcccaag 240
tacctggcct ccctggaggg ggacctcgag gcccctggagc gggagctggta gaagcttgcc 300
ctcctctccc cacccctcac cctggagaag gtggagaagg tggtgccct gaggcccccc 360
ctcacgggct ttgacctggt gcgcgtccgtc ctggagaagg accccaagga ggccttcctg 420
cgccctaggcg gcctcaagga ggagggggag gagccctca ggctcctcg ggcctctcc 480
tggcagttcg ccctcctcgc ccgggccttc ttccctcctcc gggaaaaccc caggcccaag 540
gaggaggacc tcgcccgcct cgaggcccac ccctacgccc cccgccgcgc cctggaggcg 600
gcgaagcgcc tcacggaaga gcccctcaag gaggccctgg acgcctcat ggaggcggaa 660
aagagggcca agggggggaa agaccctgg ctgcctcgtt aggccgcggt cctccgcctc 720
gcccgttga 729

<210> 158

<211> 292

<212> PRT

<213> Thermus thermophilus

<400> 158

Met Val Ile Ala Phe Thr Gly Asp Pro Phe Leu Ala Arg Glu Ala Leu
1 5 10 15

Leu Glu Glu Ala Arg Leu Arg Gly Leu Ser Arg Phe Thr Glu Pro Thr
20 25 30

Pro Glu Ala Leu Ala Gln Ala Leu Ala Pro Gly Leu Phe Gly Gly Gly
35 40 45

Gly Ala Met Leu Asp Leu Arg Glu Val Gly Glu Ala Glu Trp Lys Ala
50 55 60

Leu Lys Pro Leu Leu Glu Ser Val Pro Glu Gly Val Pro Val Leu Leu
65 70 75 80

Leu Asp Pro Lys Pro Ser Pro Ser Arg Ala Ala Phe Tyr Arg Asn Arg
85 90 95

Glu Arg Arg Asp Phe Pro Thr Pro Lys Gly Lys Asp Leu Val Arg His
100 105 110

Leu Glu Asn Arg Ala Lys Arg Leu Gly Leu Arg Leu Pro Gly Gly Val
115 120 125

Ala Gln Tyr Leu Ala Ser Leu Glu Gly Asp Leu Glu Ala Leu Glu Arg
130 135 140

Glu Leu Glu Lys Leu Ala Leu Leu Ser Pro Pro Leu Thr Leu Glu Lys
145 150 155 160

Val Glu Lys Val Val Ala Leu Arg Pro Pro Leu Thr Gly Phe Asp Leu
165 170 175

Val Arg Ser Val Leu Glu Lys Asp Pro Lys Glu Ala Leu Leu Arg Leu
180 185 190

Gly Gly Leu Lys Glu Glu Gly Glu Glu Pro Leu Arg Leu Leu Gly Ala
195 200 205

Leu Ser Trp Gln Phe Ala Leu Leu Ala Arg Ala Phe Phe Leu Leu Arg
210 215 220

Glu Asn Pro Arg Pro Lys Glu Glu Asp Leu Ala Arg Leu Glu Ala His
225 230 235 240

Pro Tyr Ala Ala Arg Arg Ala Leu Glu Ala Ala Lys Arg Leu Thr Glu
245 250 255

Glu Ala Leu Lys Glu Ala Leu Asp Ala Leu Met Glu Ala Glu Lys Arg
260 265 270

Ala Lys Gly Gly Lys Asp Pro Trp Leu Ala Leu Glu Ala Ala Val Leu
275 280 285

Arg Leu Ala Arg
290

<210> 159

<211> 37

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 159

gtgtgtcata ttagtaagga tttcggtccac ctgcacc

37

<210> 160

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 160

gtgtgtggat ccggggacta ctcggaagta aggg

34

<210> 161

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 161

gtgtgtcata tggaaaccac aatattccag ttccag

36

<210> 162

<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 162
gtgtgtggat ccttatccac catgagaagt attttcac 39

<210> 163
<211> 41
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 163
gtgtgtcata tggaaaaagt ttttttgga aaaaactcca g 41

<210> 164
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 164
gtgtgtggat ccttaatccg cctgaacggc taacg 35

<210> 165
<211> 41
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 165
gtgtgtcata tgaactacgt tcccttcgcg agaaagtaca g 41

<210> 166

<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 166
gtgtgtggat ccttaaaaca gcctcgccc gctgga 36

<210> 167
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 167
gtgtgtcata tgcgcgttaa ggtggacagg gag 33

<210> 168
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 168
tgtgtctcga gtcatggcta caccctcatc ggcatt 35

<210> 169
<211> 47
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 169
gtgtgtcata tgctcaataa ggttttata ataggaagac ttacggg 47

<210> 170

<211> 39
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 170

gtgtggatcc taaaaaaggt atttcgtcct cttcatcg

39

<210> 171

<211> 807

<212> DNA

<213> Thermus thermophilus

<400> 171

atggctcgag gcctgaaccg cgtttccctc atcggcgccc tcgccacccg gccggacatg 60
cgctacaccc cggcggggct cgccattttg gacctgaccc tcgcccgtca ggacctgctt 120
cttccgata acggggggga accggaggtg tcctggtacc accgggtgag gctcttaggc 180
cgccaggcgg agatgtgggg cgacacttgc gaccaagggc agctcgtctt cgtggaggc 240
cgccctggagt accgccaagtg gaaaaaggag ggggagaagc ggagcgagct ccagatccgg 300
gccgacttcc ggacccttg gacgaccggg ggaagaagcg ggcggaggac agccggggcc 360
agcccaggct ccgcgccgccc ctgaaccagg tcttcctcat gggcaacctg acccgggacc 420
cggaactccg ctacaccccc caaggcaccc cggtggcccg gctggccctg gcggtgaacg 480
agcgccgcca gggggcggag gagcgcaccc acttcgtgga ggttcaggcc tggcgcgacc 540
tggcggagtg ggccgcccgg ctgaggaagg ggcacggcct tttcgtgatc ggcaggttgg 600
tgaacgactc ctggaccagc tccagcggcg agcggcgctt ccagaccctg gtggaggccc 660
tcaggctgga ggcgcacc cgtggacctg cccaggcctg cccaggccgg cggAACAGGT 720
cccgcgaagt ccagacgggt ggggtggaca ttgacgaagg cttggaagac tttccgcgg 780
aggaggattt gccgttttga gcacgaa 807

<210> 172

<211> 266

<212> PRT

<213> Thermus thermophilus

<400> 172

Met Ala Arg Gly Leu Asn Arg Val Phe Leu Ile Gly Ala Leu Ala Thr
1 5 10 15

Arg Pro Asp Met Arg Tyr Thr Pro Ala Gly Leu Ala Ile Leu Asp Leu
20 25 30

Thr Leu Ala Gly Gln Asp Leu Leu Ser Asp Asn Gly Gly Glu Pro
35 40 45

Glu	Val	Ser	Trp	Tyr	His	Arg	Val	Arg	Leu	Leu	Gly	Arg	Gln	Ala	Glu
50					55						60				
Met	Trp	Gly	Asp	Leu	Leu	Asp	Gln	Gly	Gln	Leu	Val	Phe	Val	Glu	Gly
65				70					75				80		
Arg	Leu	Glu	Tyr	Arg	Gln	Trp	Glu	Arg	Glu	Gly	Glu	Lys	Arg	Ser	Glu
		85						90				95			
Leu	Gln	Ile	Arg	Ala	Asp	Phe	Leu	Asp	Pro	Leu	Asp	Asp	Arg	Gly	Lys
		100				105					110				
Lys	Arg	Ala	Glu	Asp	Ser	Arg	Gly	Gln	Pro	Arg	Leu	Arg	Ala	Ala	Leu
		115				120				125					
Asn	Gln	Val	Phe	Leu	Met	Gly	Asn	Leu	Thr	Arg	Asp	Pro	Glu	Leu	Arg
		130				135			140						
Tyr	Thr	Pro	Gln	Gly	Thr	Ala	Val	Ala	Arg	Leu	Gly	Leu	Ala	Val	Asn
		145			150			155			160				
Glu	Arg	Arg	Gln	Gly	Ala	Glu	Glu	Arg	Thr	His	Phe	Val	Glu	Val	Gln
		165				170				175					
Ala	Trp	Arg	Asp	Leu	Ala	Glu	Trp	Ala	Ala	Glu	Leu	Arg	Lys	Gly	Asp
		180				185			190						
Gly	Leu	Phe	Val	Ile	Gly	Arg	Leu	Val	Asn	Asp	Ser	Trp	Thr	Ser	Ser
		195			200			205							
Ser	Gly	Glu	Arg	Arg	Phe	Gln	Thr	Arg	Val	Glu	Ala	Leu	Arg	Leu	Glu
		210			215			220							
Arg	Pro	Thr	Arg	Gly	Pro	Ala	Gln	Ala	Cys	Pro	Gly	Arg	Arg	Asn	Arg
		225			230			235			240				
Ser	Arg	Glu	Val	Gln	Thr	Gly	Gly	Val	Asp	Ile	Asp	Glu	Gly	Leu	Glu
		245				250			255						
Asp	Phe	Pro	Pro	Glu	Glu	Asp	Leu	Pro	Phe						
		260				265									

<210> 173
<211> 992
<212> DNA
<213> *Bacillus stearothermophilus*

<400> 173

aattccgaca tttcaattga atcggttatt ccgcgtgaaa aagaaggcaa gttgctcggt 60
gatgtgaaaa gaccggggag catcgactg caggcgcgt ttttctctga aatcgtaaa 120
aaactgccgc aacaaacggt ggaaatcgaa acggaagaca acttttgac gatcatccgc 180
tcggggcact cagaattccg cctcaatggg ctaaacgccc acgaatatcc gcgcctgccc 240
caaattgaag aagaaaacgt gtttcaaattc ccggctgatt tattgaaaac cgtgattcgg 300
caaacggtgt tcgcccgttc tacatcgaa acgcgcggaa tcttgacagg tgtcaactgg 360
aaagttgaac atggcgagct tgtctgcaca gcgaccgaca gtcatcgctt agccatgcgc 420
aaagtgaaaa tttagtgcga aaatgaagta tcatacaacg tcgtcatccc tgaaaaaagt 480
cttaatgagc tcagcaaat tttggatgac ggcaaccacc cggtggacat cgtcatgaca 540
gccaatcaag tgctatttaa ggccgagcac cttcttct tttcccgct gcttgacggc 600
aactatccgg agacggcccg cttgattcca acagaaagca aaacgaccat gatcgtaat 660
gcaaaagagt ttctgcaggc aatcgaccga gcgtccttgc ttgctcgaga aggaaggaac 720
aacgttgtga aactgacgac gttcctgga ggaatgctcg aaatttcttc gatttctccg 780
agatcgggaa agtgcggag cagctgcaaa cggagtctct tgaagggaa gagttgaaca 840
tttcgttcag cgccaaatat atgatggacg cgttgcgggc gcttgatgaa acagacattt 900
caaatcagct tcactggggc catgcggccg ttccctgttgc gcccgttca accgattcga 960
tgcttcagct cattttgccc gtgagaacat at 992

<210> 174

<211> 334

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 174

Asn Ser Asp Ile Ser Ile Ile Glu Ser Phe Ile Pro Leu Glu Lys Glu
1 5 10 15

Gly Lys Leu Leu Val Asp Val Lys Arg Pro Gly Ser Ile Val Leu Gln
20 25 30

Ala Arg Phe Phe Ser Glu Ile Val Lys Lys Leu Pro Gln Gln Thr Val
35 40 45

Glu Ile Glu Thr Glu Asp Asn Phe Leu Thr Ile Ile Arg Ser Gly His
50 55 60

Ser Glu Phe Arg Leu Asn Gly Leu Asn Ala Asp Glu Tyr Pro Arg Leu
65 70 75 80

Pro Gln Ile Glu Glu Asn Val Phe Gln Ile Pro Ala Asp Leu Leu
85 90 95

Lys Thr Val Ile Arg Gln Thr Val Phe Ala Val Ser Thr Ser Glu Thr
100 105 110

Arg Pro Ile Leu Thr Gly Val Asn Trp Lys Val Glu His Gly Glu Leu

115	120	125
Val Cys Thr Ala Thr Asp Ser His Arg Leu Ala Met Arg Lys Val Lys		
130	135	140
Ile Ile Glu Ser Glu Asn Glu Val Ser Tyr Asn Val Val Ile Pro Gly		
145	150	155
Lys Ser Leu Asn Glu Leu Ser Lys Ile Ile Leu Asp Asp Gly Asn His		
165	170	175
Pro Val Asp Ile Val Met Thr Ala Asn Gln Val Leu Phe Lys Ala Glu		
180	185	190
His Leu Leu Phe Phe Ser Arg Leu Leu Asp Gly Asn Tyr Pro Glu Thr		
195	200	205
Ala Arg Leu Ile Pro Thr Glu Ser Lys Thr Thr Met Ile Val Asn Ala		
210	215	220
Lys Glu Phe Leu Gln Ala Ile Asp Arg Ala Ser Leu Leu Ala Arg Glu		
225	230	235
Gly Arg Asn Asn Val Val Lys Leu Thr Thr Leu Pro Gly Gly Met Leu		
245	250	255
Glu Ile Ser Ser Ile Ser Pro Glu Ile Gly Lys Val Thr Glu Gln Leu		
260	265	270
Gln Thr Glu Ser Leu Glu Gly Glu Glu Leu Asn Ile Ser Phe Ser Ala		
275	280	285
Lys Tyr Met Met Asp Ala Leu Arg Ala Leu Asp Gly Thr Asp Ile Gln		
290	295	300
Ile Ser Phe Thr Gly Ala Met Arg Pro Phe Leu Leu Arg Pro Leu His		
305	310	315
Thr Asp Ser Met Leu Gln Leu Ile Leu Pro Val Arg Thr Tyr		
325	330	

<210> 175
 <211> 492
 <212> DNA
 <213> *Bacillus stearothermophilus*
 <400> 175

atgattaacc gcgtcatttt ggtcgccagg ttaacgagag atccggagtt gcgttacact 60
ccaagcggag tggctgttc cacgttacg ctcgcggta accgtccgtt tacaaatcag 120
cagggcgagc gggaaacgga ttttattcaa tgtgtcggtt ggcgccgcca ggccggaaaac 180
gtcgccaact ttttggaaaaa ggggagctg gctgggtgtcg atggccgact gcaaaccgc 240
agctatgaaa atcaagaagg tcggcgtgtg tacgtgacgg aagtgggtggc tgatagcg 300
caatttcttg agccgaaagg aacgagcagc cagcggggg cgacagcagg cgctactat 360
ggggatccat tcccattcgg gcaagatcag aaccaccaat atccgaacga aaaagggttt 420
ggccgcacatcg atgacgatcc ttgcgccaat gacggccagc cgatcgatat ttctgatgat 480
gatttgcgtt tt 492

<210> 176

<211> 164

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 176

Met Ile Asn Arg Val Ile Leu Val Gly Arg Leu Thr Arg Asp Pro Glu
1 5 10 15

Leu Arg Tyr Thr Pro Ser Gly Val Ala Val Ala Thr Phe Thr Leu Ala
20 25 30

Val Asn Arg Pro Phe Thr Asn Gln Ser Tyr Glu Asn Gln Glu Gly Arg
35 40 45

Arg Val Tyr Val Thr Glu Val Val Ala Asp Ser Val Gln Phe Leu Glu
50 55 60

Pro Lys Gly Thr Ser Glu Gln Arg Gly Ala Thr Ala Gly Gly Tyr Tyr
65 70 75 80

Gln Gly Glu Arg Glu Thr Asp Phe Ile Gln Cys Val Val Trp Arg Arg
85 90 95

Gln Ala Glu Asn Val Ala Asn Phe Leu Lys Lys Gly Ser Leu Ala Gly
100 105 110

Val Asp Gly Arg Leu Gln Thr Arg Gly Asp Pro Phe Pro Phe Gly Gln
115 120 125

Asp Gln Asn His Gln Tyr Pro Asn Glu Lys Gly Phe Gly Arg Ile Asp
130 135 140

Asp Asp Pro Phe Ala Asn Asp Gly Gln Pro Ile Asp Ile Ser Asp Asp
145 150 155 160

Asp Leu Pro Phe

<210> 177
<211> 1044
<212> DNA
<213> *Bacillus stearothermophilus*

<400> 177
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tacggcaatg agccgTTTT attaacggAA acgtatgAGC gattggTgAA cgcaGcgCTT 120
ggccccgagg agcgggagtg gaacttggCT gtgtacgact gCGAGGAAC gcccAtcgAG 180
gcggcgCTT aggaggCCgA gacggTgCCg TTTTCggCg agcggcgTGT cattctcatc 240
aagcatccat atTTTTTAc gtctgaaaaa gagaaggaga tcgaacatgA tttggcgaag 300
ctggaggcgt acttgaaggc gccgtcgCCg ttttcgatcG tcgtctttt cgcGCCgtac 360
gagaagcttG atgagcggAA AAAAATTACg aagctcgCCA aagagcaAG cgaagtCGTC 420
atcgccgccc cgctcgCCgA agcggagCTg cgtgcctggg tgCggcgCCg catcgagAGc 480
caaggggcgcA aagcaagcGA cgaggcgAtt gatgtcctgt tgCggcgGGc cggacgcAG 540
cttccgcct tggcgaatgA aatcgataAA ttggccctgt ttgcccgtc gggcggAACc 600
atcgaggcgg cgccggTTgA gccggcttgc gcccgcacgc cggaaAGAAA cgtatttGtG 660
cttgcgagc aagtggcgaA gCgcgacatt ccagcagcgt tgCagacGtt ttatgatctg 720
cttggaaaaca atgaagagcC gatcaaAAtt ttggcgttgc tgCccgcCcA tttccgcTTg 780
cttgcgaag tgaaatggct tgCctccttA ggctacggac aggCGcaat tgCtgccgCG 840
ctcaagggtgc acccgTTccg cgtcaagcTC gctttgctc aagcggcccG ctCgctgac 900
ggagagcttG ctgaggcgt caacgagcTC gctgacGCCg attacgaaGt gaaaAGcGGG 960
gcggcgtcgtc gccggTTggc cgttgagctg cttctgatgc gctggggcgc ccggccggcG 1020
caagcggggc gccacggccg gcgg 1044

<210> 178
<211> 348
<212> PRT
<213> *Bacillus stearothermophilus*

<400> 178
Met Leu Glu Arg Val Trp Gly Asn Ile Glu Lys Arg Arg Phe Ser Pro
1 5 10 15

Leu Tyr Leu Leu Tyr Gly Asn Glu Pro Phe Leu Leu Thr Glu Thr Tyr
20 25 30

Glu Arg Leu Val Asn Ala Ala Leu Gly Pro Glu Glu Arg Glu Trp Asn
35 40 45

Leu Ala Val Tyr Asp Cys Glu Glu Thr Pro Ile Glu Ala Ala Leu Glu
50 55 60

Glu Ala Glu Thr Val Pro Phe Phe Gly Glu Arg Arg Val Ile Leu Ile

65	70	75	80
Lys His Pro Tyr Phe Phe Thr Ser Glu Lys Glu Lys Glu Ile Glu His			
85	90	95	
Asp Leu Ala Lys Leu Glu Ala Tyr Leu Lys Ala Pro Ser Pro Phe Ser			
100	105	110	
Ile Val Val Phe Phe Ala Pro Tyr Glu Lys Leu Asp Glu Arg Lys Lys			
115	120	125	
Ile Thr Lys Leu Ala Lys Glu Gln Ser Glu Val Val Ile Ala Ala Pro			
130	135	140	
Leu Ala Glu Ala Glu Leu Arg Ala Trp Val Arg Arg Arg Ile Glu Ser			
145	150	155	160
Gln Gly Ala Gln Ala Ser Asp Glu Ala Ile Asp Val Leu Leu Arg Arg			
165	170	175	
Ala Gly Thr Gln Leu Ser Ala Leu Ala Asn Glu Ile Asp Lys Leu Ala			
180	185	190	
Leu Phe Ala Gly Ser Gly Gly Thr Ile Glu Ala Ala Val Glu Arg			
195	200	205	
Leu Val Ala Arg Thr Pro Glu Glu Asn Val Phe Val Leu Val Glu Gln			
210	215	220	
Val Ala Lys Arg Asp Ile Pro Ala Ala Leu Gln Thr Phe Tyr Asp Leu			
225	230	235	240
Leu Glu Asn Asn Glu Glu Pro Ile Lys Ile Leu Ala Leu Leu Ala Ala			
245	250	255	
His Phe Arg Leu Leu Ser Gln Val Lys Trp Leu Ala Ser Leu Gly Tyr			
260	265	270	
Gly Gln Ala Gln Ile Ala Ala Leu Lys Val His Pro Phe Arg Val			
275	280	285	
Lys Leu Ala Leu Ala Gln Ala Ala Arg Phe Ala Asp Gly Glu Leu Ala			
290	295	300	
Glu Ala Ile Asn Glu Leu Ala Asp Ala Asp Tyr Glu Val Lys Ser Gly			
305	310	315	320
Ala Val Asp Arg Arg Leu Ala Val Glu Leu Leu Leu Met Arg Trp Gly			

325

330

335

Ala Arg Pro Ala Gln Ala Gly Arg His Gly Arg Arg
340 345

<210> 179

<211> 757

<212> DNA

<213> Bacillus stearothermophilus

<400> 179

atgcgatggg aacagctagc gaaacgccag ccgggtggcg cggaaaatgct gcaaaggccgc 60
ttggaaaaag ggcggatttc tcatgcgtac ttgtttgagg ggcagcgggg gacgggcaaa 120
aaagcggcca gtttgggtt ggcgaaacgt ttgtttgtc tgtccccat cgaggtttcc 180
ccgtgtctag agtgccgcaa ctgcccggcgc atcgactccg gcaaccaccc tgacgtccgg 240
gtgatcggcc cagatggagg atcaatcaaa aaggaacaaa tcgaatgct gcagcaagag 300
ttctcgaaaa cagcggtcga gtcggataaaa aaaatgtaca tcgttgagca cgccgatcaa 360
atgacgacaa gcgctgccaa cagccttctg aaattttgg aagagccgca tccggggacg 420
gtggcggtat tgctgactga gcaataccac cgccctgctag ggacgatcgt ttcccgctgt 480
caagtgcctt cgttccggcc gttgcccggc gcagagctcg cccagggact tgtcgaggag 540
cacgtgccgt tgccgttggc gctgttggct gcccatttga caaacagctt cgaggaagca 600
ctggcgcttg ccaaagatag ttggtttgcg gaggcgcgaa cattagtct acaatggtat 660
gagatgctgg gcaagccgga gctgcagctt ttgttttca tccacgaccg cttgtttccg 720
catttttgg aaagccatca gcttgacctt ggacttg 757

<210> 180

<211> 252

<212> PRT

<213> Bacillus stearothermophilus

<400> 180

Met Arg Trp Glu Gln Leu Ala Lys Arg Gln Pro Val Val Ala Lys Met
1 5 10 15

Leu Gln Ser Gly Leu Glu Lys Gly Arg Ile Ser His Ala Tyr Leu Phe
20 25 30

Glu Gly Gln Arg Gly Thr Gly Lys Lys Ala Ala Ser Leu Leu Ala
35 40 45

Lys Arg Leu Phe Cys Leu Ser Pro Ile Gly Val Ser Pro Cys Leu Glu
50 55 60

Cys Arg Asn Cys Arg Arg Ile Asp Ser Gly Asn His Pro Asp Val Arg
65 70 75 80

Val Ile Gly Pro Asp Gly Gly Ser Ile Lys Lys Glu Gln Ile Glu Trp
85 90 95

Leu Gln Gln Glu Phe Ser Lys Thr Ala Val Glu Ser Asp Lys Lys Met
100 105 110

Tyr Ile Val Glu His Ala Asp Gln Met Thr Thr Ser Ala Ala Asn Ser
115 120 125

Leu Leu Lys Phe Leu Glu Glu Pro His Pro Gly Thr Val Ala Val Leu
130 135 140

Leu Thr Glu Gln Tyr His Arg Leu Leu Gly Thr Ile Val Ser Arg Cys
145 150 155 160

Gln Val Leu Ser Phe Arg Pro Leu Pro Pro Ala Glu Leu Ala Gln Gly
165 170 175

Leu Val Glu Glu His Val Pro Leu Pro Leu Ala Leu Leu Ala Ala His
180 185 190

Leu Thr Asn Ser Phe Glu Glu Ala Leu Ala Leu Lys Asp Ser Trp
195 200 205

Phe Ala Glu Ala Arg Thr Leu Val Leu Gln Trp Tyr Glu Met Leu Gly
210 215 220

Lys Pro Glu Leu Gln Leu Leu Phe Phe Ile His Asp Arg Leu Phe Pro
225 230 235 240

His Phe Leu Glu Ser His Gln Leu Asp Leu Gly Leu
245 250

<210> 181

<211> 1677

<212> DNA

<213> *Bacillus stearothermophilus*

<400> 181

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caagaacacg tgaccaagac gttgcaaagc gccctgcttc aacataaaat atcgcacgct 120
tacttatttt ccggcccgcg cggtagcaggaa aaaacgagcg cagcggaaaat tttcgccaag 180
gcggtaact gtgaacaggc gccagcggcg gagccatgca atgagtgtcc agcttgccctc 240
ggcattacga atggaacggt tccccatgtc ctggaaattt acgctgcttc caacaaccgc 300
gtcgatgaaa ttctgtatcccgtagaaatgtgaaatgg cggcaacgctc ggcccgtac 360
aaagtgtata tcatcgacga ggtgcataatgt ctgtcgatcg gtgcgtttaa cgcgcgttgc 420
aaaacgttgg aggagccgcc gaaacacgctc attttcattt tggccacgac cgagccgcac 480

aaaattccgg cgacgatcat ttcccgtgc caacggttcg atttcgccg catcccgctt 540
caggcgtcg tttcacggct aaagtacgtc gcaagcgccc aaggtgtcga ggcgtcagat 600
gaggcattgt ccgccatcgc ccgtgtgcgca gacggggggta tgccgcgtgc gctcagcttg 660
cttgatcaag ccatttcgtt cagcgcacggg aaacttcggc tcgacgacgt gctggcgatg 720
accggggctg catcatatgc cgccattatcg agcttcatcg aagccatcca ccgcaaagat 780
acagcggcgg ttcttcagca ctggaaacg atgatggcgc aaggaaaga tccgcacgt 840
ttgttgaag acttgatcccgtt gtttattgc tgtacaaaac cgctccctat 900
gtggagggag cgattcaaataat tgctgtcggt gacgaagcgt tcacttcact gtcggaaatg 960
atcccggttt ccaattata cgaggccatc gagttgtcga acaaaagcca gcaagagatg 1020
aagtggacaa accaccgcg ccttctgttg gaagtggcgc ttgtgaaact ttgccccatcca 1080
tcagccgcg ccccggtcgct gtcggcttcc gagttggAAC cggtgataaa gcgattgaa 1140
acgctggagg cggaatttgcg ggcgcgtgaag gaacaaccgc ctggccctcc gtcgaccgc 1200
gcggccgtga aaaaactgtc caaacccatg aaaaacggggg gatataaagc cccgggttggc 1260
cgcatatcg agctgtgaa acaggcgacg catgaagatt tagcttttgtt gaaaggatgc 1320
tggcggtatg tgctcgacac gttgaaacgg cagcataaag tgtcgacgc tgccttgctg 1380
caagagagcg agccgggtgc agcgagcgc tcagcggttg tattaaaatt caaatacgaa 1440
atccactgca aaatggcgac cgatcccaca agttcggtca aagaaaaacgt cgaagcgatt 1500
ttgtttaggc tgacaaaccg ccgccttgcgaa atggtagcca ttccggaggg agaatgggg 1560
aaaataagag aagagttcat ccgcaataag gacgcacatgg tggaaaaaaag cgaagaagat 1620
ccgttaatcg ccgaagcgaa gcggctgttt ggcgaagagc tgatcgaaat taaagaa 1677

<210> 182

<211> 559

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 182

Val	Ala	Tyr	Gln	Ala	Leu	Tyr	Arg	Val	Phe	Arg	Pro	Gln	Arg	Phe	Ala
1								10						15	

Asp	Met	Val	Gly	Gln	Glu	His	Val	Thr	Lys	Thr	Leu	Gln	Ser	Ala	Leu
														20	30

Leu	Gln	His	Lys	Ile	Ser	His	Ala	Tyr	Leu	Phe	Ser	Gly	Pro	Arg	Gly
														35	45

Thr	Gly	Lys	Thr	Ser	Ala	Ala	Lys	Ile	Phe	Ala	Lys	Ala	Val	Asn	Cys
														50	60

Glu	Gln	Ala	Pro	Ala	Ala	Glu	Pro	Cys	Asn	Glu	Cys	Pro	Ala	Cys	Leu
														65	80

Gly	Ile	Thr	Asn	Gly	Thr	Val	Pro	Asp	Val	Leu	Glu	Ile	Asp	Ala	Ala
														85	95

Ser	Asn	Asn	Arg	Val	Asp	Glu	Ile	Arg	Asp	Ile	Arg	Glu	Lys	Val	Lys
														100	110

Phe Ala Pro Thr Ser Ala Arg Tyr Lys Val Tyr Ile Ile Asp Glu Val
115 120 125

His Met Leu Ser Ile Gly Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu
130 135 140

Glu Pro Pro Lys His Val Ile Phe Ile Leu Ala Thr Thr Glu Pro His
145 150 155 160

Lys Ile Pro Ala Thr Ile Ile Ser Arg Cys Gln Arg Phe Asp Phe Arg
165 170 175

Arg Ile Pro Leu Gln Ala Ile Val Ser Arg Leu Lys Tyr Val Ala Ser
180 185 190

Ala Gln Gly Val Glu Ala Ser Asp Glu Ala Leu Ser Ala Ile Ala Arg
195 200 205

Ala Ala Asp Gly Gly Met Arg Asp Ala Leu Ser Leu Leu Asp Gln Ala
210 215 220

Ile Ser Phe Ser Asp Gly Lys Leu Arg Leu Asp Asp Val Leu Ala Met
225 230 235 240

Thr Gly Ala Ala Ser Phe Ala Ala Leu Ser Ser Phe Ile Glu Ala Ile
245 250 255

His Arg Lys Asp Thr Ala Ala Val Leu Gln His Leu Glu Thr Met Met
260 265 270

Ala Gln Gly Lys Asp Pro His Arg Leu Val Glu Asp Leu Ile Leu .Tyr
275 280 285

Tyr Arg Asp Leu Leu Tyr Lys Thr Ala Pro Tyr Val Glu Gly Ala
290 295 300

Ile Gln Ile Ala Val Val Asp Glu Ala Phe Thr Ser Leu Ser Glu Met
305 310 315 320

Ile Pro Val Ser Asn Leu Tyr Glu Ala Ile Glu Leu Leu Asn Lys Ser
325 330 335

Gln Gln Glu Met Lys Trp Thr Asn His Pro Arg Leu Leu Leu Glu Val
340 345 350

Ala Leu Val Lys Leu Cys His Pro Ser Ala Ala Ala Pro Ser Leu Ser
355 360 365

Ala Ser Glu Leu Glu Pro Leu Ile Lys Arg Ile Glu Thr Leu Glu Ala
370 375 380

Glu Leu Arg Arg Leu Lys Glu Gln Pro Pro Ala Pro Pro Ser Thr Ala
385 390 395 400

Ala Pro Val Lys Lys Leu Ser Lys Pro Met Lys Thr Gly Gly Tyr Lys
405 410 415

Ala Pro Val Gly Arg Ile Tyr Glu Leu Leu Lys Gln Ala Thr His Glu
420 425 430

Asp Leu Ala Leu Val Lys Gly Cys Trp Ala Asp Val Leu Asp Thr Leu
435 440 445

Lys Arg Gln His Lys Val Ser His Ala Ala Leu Leu Gln Glu Ser Glu
450 455 460

Pro Val Ala Ala Ser Ala Ser Ala Phe Val Leu Lys Phe Lys Tyr Glu
465 470 475 480

Ile His Cys Lys Met Ala Thr Asp Pro Thr Ser Ser Val Lys Glu Asn
485 490 495

Val Glu Ala Ile Leu Phe Glu Leu Thr Asn Arg Arg Phe Glu Met Val
500 505 510

Ala Ile Pro Glu Gly Glu Trp Gly Lys Ile Arg Glu Glu Phe Ile Arg
515 520 525

Asn Lys Asp Ala Met Val Glu Lys Ser Glu Glu Asp Pro Leu Ile Ala
530 535 540

Glu Ala Lys Arg Leu Phe Gly Glu Glu Leu Ile Glu Ile Lys Glu
545 550 555

<210> 183

<211> 4301

<212> DNA

<213> *Bacillus stearothermophilus*

<400> 183

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gaggagaaaa gctggcattt ttatttcag ttgcacaacg tgctgccggt tcatgtatac 180
aaaacgtttc ccgatcggt gcagacggcg ttccggccata tcgcccgggt ccgcatacg 240

atggaggtcg aagcgcggcg cgtaactgag gcggatgtgc aggcttattt gcccgtttgc 300
cttgcggagc tgcaagaagg catgtcgccg cttgtcgatt ggctcagccg gcagacgcct 360
gagctgaaag gaaacaagct gcttgcgtt gcccgcctg aagcggaaagc gctggcgatc 420
aaacggcggt tcgccaaaaa aatcgctgat gtgtacgctt cgtttgggtt tccccccctt 480
cagcttgacg tcagcgtcga gccgtccaag caagaaatgg aacagttttt ggcgcaaaaa 540
cagcaagagg acgaagagcg agcgcttgct gtactgaccg atttagcgag ggaagaagaa 600
aaggccgcgt ctgcgcccgg gtcgggtccg cttgtcatcg gctatccgat ccgcgacgag 660
gagccgggtgc ggccggcttga aacgatcgtc gaagaagagc ggccgcgtcg tgcgcaaggc 720
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gagcttatgac gcggcggtcaa aaaaggcatg tgggtgaaag tgcgccccgg cgtgcacaaac 900
gatacgttcg tccgtgattt ggtcatcatc gccaacgatt tgaacgaaat ccgcgcaaac 960
gaacggcaag atacggcgcc ggaaggggaa aagagggtcg agctccattt gcatacccg 1020
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gtgcccggata tcgacttgcgtt ctttccggc gaataccagc cgcgcgcacca caactatacg 2940
aaagtgcgtt ttggcgaaga caacgtctac cgcgcggga cgattggcactt ggtcgctgac 3000
aaaacggcgatc acggattttgtt caaagcgtat gcgagcgcacc ataacttaga gctgcgcggc 3060
gcggaaatcg acggcgtcgcc gctggctgca ccgggggtgaa gcggacgcacc gggcagcatc 3120

cggcgccat catcgctgcatc ccggattata tggaaattta cgattttacg ccgattcaat 3180
 atccggccga tgacacgtcc tctgaatggc ggacgaccgc tttcgacttc cattcgatcc 3240
 acgacaattt gttgaagctc gatattctcg ggcacgacga tccgacggtc attcgatgc 3300
 tgcaagattt aagcggcattc gatccgaaaaa cgatcccac cgacgaccgc gatgtatgg 3360
 gcattttcag cagcaccgag ccgcttggcg ttacgcccga gcaaattatg tgcaatgtcg 3420
 gcacgatcggtt cattccggag tttggcacgc gcttcgttcg gcaaatttttga gaagagacaa 3480
 ggccaaaaac gttttccgaa ctcgtcaaa ttccggctt gtcgcacggc accgatgtgt 3540
 ggctcggcaa cgcgcaagag ctcatcaaa acggcacgtg tacgttatcg gaagtcatcg 3600
 gctgccgca cgacattatg gtctatttga tttaccgcgg gctcgagccg tcgctcgctt 3660
 ttaaaatcat ggaatccgtg cgcaaaggaa aaggcttaac gccggagttt gaagcagaaa 3720
 tgccaaaca tgacgtgccc gagtggtaca tcgattcatg caaaaaaaaaatc aagtacatgt 3780
 tcccgaaagc gcacggccgc gcctacgtgt taatggcggt ggcacatgcc tacttaagg 3840
 tgcaccatcc gctttgtat tacgcgtcg actttacggt gccccggag gactttgacc 3900
 ttgacgccc gatcaaagga tcacccgcca ttgcgaagcg gattgaggaa atcaacgcca 3960
 aaggcattca ggcgacggcg aaagaaaaaa gcttgctcac gtttctttagt gtggccttag 4020
 agatgtgcga ggcgacggcg tcctttaaaa atatcgattt gtaccgctcg caggcgacgg 4080
 aattcgtcat tgacggcaat tctctcattc cgccgttcaa cgccattccg gggcttggga 4140
 cgaacgtggc gcaggcgatc gtgcgcgcgc gcgaggaagg cgagtttttgcg aggaggagg 4200
 atttgcaaca ggcgacggcaaa ttgtcgaaaaa cgctgctcgat gatatctagaa agccgcggct 4260
 gccttgactc gcttccagac cataaccagc tgtcgctgtt t 4301

<210> 184

<211> 1433

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 184

Met	Val	Thr	Lys	Glu	Gln	Lys	Glu	Arg	Phe	Leu	Ile	Leu	Leu	Glu	Gln
1				5					10					15	

Leu	Lys	Met	Thr	Ser	Asp	Glu	Trp	Met	Pro	His	Phe	Arg	Glu	Ala	Ala
								20			25			30	

Ile	Arg	Lys	Val	Val	Ile	Asp	Lys	Glu	Glu	Lys	Ser	Trp	His	Phe	Tyr
								35			40			45	

Phe	Gln	Phe	Asp	Asn	Val	Leu	Pro	Val	His	Val	Tyr	Lys	Thr	Phe	Ala
								50			55			60	

Asp	Arg	Leu	Gln	Thr	Ala	Phe	Arg	His	Ile	Ala	Ala	Val	Arg	His	Thr
								65			70			75	

Met	Glu	Val	Glu	Ala	Pro	Arg	Val	Thr	Glu	Ala	Asp	Val	Gln	Ala	Tyr
								85			90			95	

Trp	Pro	Leu	Cys	Leu	Ala	Glu	Leu	Gln	Glu	Gly	Met	Ser	Pro	Leu	Val
								100			105			110	

Asp Trp Leu Ser Arg Gln Thr Pro Glu Leu Lys Gly Asn Lys Leu Leu
115 120 125

Val Val Ala Arg His Glu Ala Glu Ala Leu Ala Ile Lys Arg Arg Phe
130 135 140

Ala Lys Lys Ile Ala Asp Val Tyr Ala Ser Phe Gly Phe Pro Pro Leu
145 150 155 160

Gln Leu Asp Val Ser Val Glu Pro Ser Lys Gln Glu Met Glu Gln Phe
165 170 175

Leu Ala Gln Lys Gln Gln Glu Asp Glu Glu Arg Ala Leu Ala Val Leu
180 185 190

Thr Asp Leu Ala Arg Glu Glu Lys Ala Ala Ser Ala Pro Pro Ser
195 200 205

Gly Pro Leu Val Ile Gly Tyr Pro Ile Arg Asp Glu Glu Pro Val Arg
210 215 220

Arg Leu Glu Thr Ile Val Glu Glu Glu Arg Arg Val Val Val Gln Gly
225 230 235 240

Tyr Val Phe Asp Ala Glu Val Ser Glu Leu Lys Ser Gly Arg Thr Leu
245 250 255

Leu Thr Met Lys Ile Thr Asp Tyr Thr Asn Ser Ile Leu Val Lys Met
260 265 270

Phe Ser Arg Asp Lys Glu Asp Ala Glu Leu Met Ser Gly Val Lys Lys
275 280 285

Gly Met Trp Val Lys Val Arg Gly Ser Val Gln Asn Asp Thr Phe Val
290 295 300

Arg Asp Leu Val Ile Ile Ala Asn Asp Leu Asn Glu Ile Ala Ala Asn
305 310 315 320

Glu Arg Gln Asp Thr Ala Pro Glu Gly Glu Lys Arg Val Glu Leu His
325 330 335

Leu His Thr Pro Met Ser Gln Met Asp Ala Val Thr Ser Val Thr Lys
340 345 350

Leu Ile Glu Gln Ala Lys Lys Trp Gly His Pro Ala Ile Ala Val Thr
355 360 365

Asp His Ala Val Val Gln Ser Phe Pro Glu Ala Tyr Ser Ala Ala Lys
370 375 380

Lys His Gly Met Lys Val Ile Tyr Gly Leu Glu Ala Asn Ile Val Asp
385 390 395 400

Asp Gly Val Pro Ile Ala Tyr Asn Glu Thr His Arg Arg Leu Ser Glu
405 410 415

Glu Thr Tyr Val Val Phe Asp Val Glu Thr Thr Gly Leu Ser Ala Val
420 425 430

Tyr Asn Thr Ile Ile Glu Leu Ala Ala Val Lys Val Lys Asp Gly Glu
435 440 445

Ile Ile Asp Arg Phe Met Ser Phe Ala Asn Pro Gly His Pro Leu Ser
450 455 460

Val Thr Thr Met Glu Leu Thr Gly Ile Thr Asp Glu Met Val Lys Asp
465 470 475 480

Ala Pro Lys Pro Asp Glu Val Leu Ala Arg Phe Val Asp Trp Ala Gly
485 490 495

Asp Ala Thr Leu Val Ala His Asn Ala Ser Phe Asp Ile Gly Phe Leu
500 505 510

Asn Ala Gly Leu Ala Arg Met Gly Arg Gly Lys Ile Ala Asn Pro Val
515 520 525

Ile Asp Thr Leu Glu Leu Ala Arg Phe Leu Tyr Pro Asp Leu Lys Asn
530 535 540

His Arg Leu Asn Thr Leu Cys Lys Lys Phe Asp Ile Glu Leu Thr Gln
545 550 555 560

His His Arg Ala Ile Tyr Asp Ala Glu Ala Thr Gly His Leu Leu Met
565 570 575

Arg Leu Leu Lys Glu Ala Glu Glu Arg Gly Ile Leu Phe His Asp Glu
580 585 590

Leu Asn Ser Arg Thr His Ser Glu Ala Ser Tyr Arg Leu Ala Arg Pro
595 600 605

Phe His Val Thr Leu Leu Ala Gln Asn Glu Thr Gly Leu Lys Asn Leu
610 615 620

Phe Lys Leu Val Ser Leu Ser His Ile Gln Tyr Phe His Arg Val Pro
625 630 635 640

Arg Ile Pro Arg Ser Val Leu Val Lys His Arg Asp Gly Leu Leu Val
645 650 655

Gly Ser Gly Cys Asp Lys Gly Glu Leu Phe Asp Asn Leu Ile Gln Lys
660 665 670

Ala Pro Glu Glu Val Glu Asp Ile Ala Arg Phe Tyr Asp Phe Leu Glu
675 680 685

Val His Pro Pro Asp Val Tyr Lys Pro Leu Ile Glu Met Asp Tyr Val
690 695 700

Lys Asp Glu Glu Met Ile Lys Asn Ile Ile Arg Ser Ile Val Ala Leu
705 710 715 720

Gly Glu Lys Leu Asp Ile Pro Val Val Ala Thr Gly Asn Val His Tyr
725 730 735

Leu Asn Pro Glu Asp Lys Ile Tyr Arg Lys Ile Leu Ile His Ser Gln
740 745 750

Gly Gly Ala Asn Pro Leu Asn Arg His Glu Leu Pro Asp Val Tyr Phe
755 760 765

Arg Thr Thr Asn Glu Met Leu Asp Cys Phe Ser Phe Leu Gly Pro Glu
770 775 780

Lys Ala Lys Glu Ile Val Val Asp Asn Thr Gln Lys Ile Ala Ser Leu
785 790 795 800

Ile Gly Asp Val Lys Pro Ile Lys Asp Glu Leu Tyr Thr Pro Arg Ile
805 810 815

Glu Gly Ala Asp Glu Glu Ile Arg Glu Met Ser Tyr Arg Arg Ala Lys
820 825 830

Glu Ile Tyr Gly Asp Pro Leu Pro Lys Leu Val Glu Glu Arg Leu Glu
835 840 845

Lys Glu Leu Lys Ser Ile Ile Gly His Gly Phe Ala Val Ile Tyr Leu
850 855 860

Ile Ser His Lys Leu Val Lys Lys Ser Leu Asp Asp Gly Tyr Leu Val
865 870 875 880

Gly Ser Arg Gly Ser Val Gly Ser Ser Phe Val Ala Thr Met Thr Glu
885 890 895

Ile Thr Glu Val Asn Pro Leu Pro Pro His Tyr Val Cys Pro Asn Cys
900 905 910

Lys His Ser Glu Phe Phe Asn Asp Gly Ser Val Gly Ser Gly Phe Asp
915 920 925

Leu Pro Asp Lys Asn Cys Pro Arg Cys Gly Thr Lys Tyr Lys Lys Asp
930 935 940

Gly His Asp Ile Pro Phe Glu Thr Phe Leu Gly Phe Lys Gly Asp Lys
945 950 955 960

Val Pro Asp Ile Asp Leu Asn Phe Ser Gly Glu Tyr Gln Pro Arg Ala
965 970 975

His Asn Tyr Thr Lys Val Leu Phe Gly Glu Asp Asn Val Tyr Arg Ala
980 985 990

Gly Thr Ile Gly Thr Val Ala Asp Lys Thr Ala Tyr Gly Phe Val Lys
995 1000 1005

Ala Tyr Ala Ser Asp His Asn Leu Glu Leu Arg Gly Ala Glu Ile Asp
1010 1015 1020

Leu Ala Ala Gly Cys Thr Gly Val Lys Arg Thr Thr Gly Gln His Pro
1025 1030 1035 1040

Gly Gly Ile Ile Val Val Pro Asp Tyr Met Glu Ile Tyr Asp Phe Thr
1045 1050 1055

Pro Ile Gln Tyr Pro Ala Asp Asp Thr Ser Ser Glu Trp Arg Thr Thr
1060 1065 1070

His Phe Asp Phe His Ser Ile His Asp Asn Leu Leu Lys Leu Asp Ile
1075 1080 1085

Leu Gly His Asp Asp Pro Thr Val Ile Arg Met Leu Gln Asp Leu Ser
1090 1095 1100

Gly Ile Asp Pro Lys Thr Ile Pro Thr Asp Asp Pro Asp Val Met Gly
1105 1110 1115 1120

Ile Phe Ser Ser Thr Glu Pro Leu Gly Val Thr Pro Glu Gln Ile Met
1125 1130 1135

Cys Asn Val Gly Thr Ile Gly Ile Pro Glu Phe Gly Thr Arg Phe Val
1140 1145 1150

Arg Gln Met Leu Glu Glu Thr Arg Pro Lys Thr Phe Ser Glu Leu Val
1155 1160 1165

Gln Ile Ser Gly Leu Ser His Gly Thr Asp Val Trp Leu Gly Asn Ala
1170 1175 1180

Gln Glu Leu Ile Gln Asn Gly Thr Cys Thr Leu Ser Glu Val Ile Gly
1185 1190 1195 1200

Cys Arg Asp Asp Ile Met Val Tyr Leu Ile Tyr Arg Gly Leu Glu Pro
1205 1210 1215

Ser Leu Ala Phe Lys Ile Met Glu Ser Val Arg Lys Gly Lys Gly Leu
1220 1225 1230

Thr Pro Glu Phe Glu Ala Glu Met Arg Lys His Asp Val Pro Glu Trp
1235 1240 1245

Tyr Ile Asp Ser Cys Lys Lys Ile Lys Tyr Met Phe Pro Lys Ala His
1250 1255 1260

Ala Ala Ala Tyr Val Leu Met Ala Val Arg Ile Ala Tyr Phe Lys Val
1265 1270 1275 1280

His His Pro Leu Leu Tyr Tyr Ala Ser Tyr Phe Thr Val Arg Ala Glu
1285 1290 1295

Asp Phe Asp Leu Asp Ala Met Ile Lys Gly Ser Pro Ala Ile Arg Lys
1300 1305 1310

Arg Ile Glu Glu Ile Asn Ala Lys Gly Ile Gln Ala Thr Ala Lys Glu
1315 1320 1325

Lys Ser Leu Leu Thr Val Leu Glu Val Ala Leu Glu Met Cys Glu Arg
1330 1335 1340

Gly Phe Ser Phe Lys Asn Ile Asp Leu Tyr Arg Ser Gln Ala Thr Glu
1345 1350 1355 1360

Phe Val Ile Asp Gly Asn Ser Leu Ile Pro Pro Phe Asn Ala Ile Pro
1365 1370 1375

Gly Leu Gly Thr Asn Val Ala Gln Ala Ile Val Arg Ala Arg Glu Glu
1380 1385 1390

Gly Glu Phe Leu Ser Lys Glu Asp Leu Gln Gln Arg Gly Lys Leu Ser
 1395 1400 1405

 Lys Thr Leu Leu Glu Tyr Leu Glu Ser Arg Gly Cys Leu Asp Ser Leu
 1410 1415 1420

 Pro Asp His Asn Gln Leu Ser Leu Phe
 1425 1430

 <210> 185
 <211> 199
 <212> PRT
 <213> Thermus thermophilus

 <400> 185
 Thr Pro Lys Gly Lys Asp Leu Val Arg His Leu Glu Asn Arg Ala Lys
 1 5 10 15

 Arg Leu Gly Leu Arg Leu Pro Gly Gly Val Ala Gln Tyr Leu Ala Ser
 20 25 30

 Leu Glu Gly Asp Leu Glu Ala Leu Glu Arg Glu Leu Glu Lys Leu Ala
 35 40 45

 Leu Leu Ser Pro Pro Leu Thr Leu Glu Lys Val Glu Lys Val Val Ala
 50 55 60

 Leu Arg Pro Pro Leu Thr Gly Phe Asp Leu Val Arg Ser Val Leu Glu
 65 70 75 80

 Lys Asp Pro Lys Glu Ala Leu Leu Arg Leu Gly Arg Leu Lys Glu Glu
 85 90 95

 Gly Glu Glu Pro Leu Arg Leu Leu Gly Ala Leu Ser Trp Gln Phe Ala
 100 105 110

 Leu Leu Ala Arg Ala Phe Phe Leu Leu Arg Glu Met Pro Arg Pro Lys
 115 120 125

 Glu Glu Asp Leu Ala Arg Leu Glu Ala His Pro Tyr Ala Ala Lys Lys
 130 135 140

 Ala Leu Leu Glu Ala Ala Arg Arg Leu Thr Glu Glu Ala Leu Lys Glu
 145 150 155 160

 Ala Leu Asp Ala Leu Met Glu Ala Glu Lys Arg Ala Lys Gly Gly Lys

165

170

175

Asp Pro Trp Leu Ala Leu Glu Ala Ala Val Leu Arg Leu Ala Arg Pro
180 185 190

Ala Gly Gln Pro Arg Val Asp
195

<210> 186

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 186

gccccagtagacc tcgcctccct cgagggg

27

<210> 187

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 187

ggccccccttg gccttctcggt cctccat

27

<210> 188

<211> 331

<212> DNA

<213> Thermus thermophilus

<400> 188

agaactcgagg ccctggagcg ggagctggag aagcttgcgg tcctctcccc acccctcacc 60
ctggagaagg tggagaagggt ggtggccctg aggccccccc tcacgggctt tgacctggtg 120
cgctccgtcc tggagaaggta ccccaaggag gcccctctgc gcctcaggcg cctcaggag 180
gagggggagg agcccctcag gctcctcggt gcccctctcct ggcagttcgc cctcctcgcc 240
cgggccttct tcctcctccg gaaaaacccc aggcccaagg aggaggacct cgcccgccctc 300
gaggcccacc cctacgccgc caagaaggcc a 331

<210> 189

<211> 110

<212> PRT

<213> Thermus thermophilus

<400> 189

Arg Leu Glu Ala Leu Glu Arg Glu Leu Glu Lys Leu Ala Leu Leu Ser
1 5 10 15

Pro Pro Leu Thr Leu Glu Lys Val Glu Lys Val Val Ala Leu Arg Pro
20 25 30

Pro Leu Thr Gly Phe Asp Leu Val Arg Ser Val Leu Glu Lys Asp Pro
35 40 45

Lys Glu Ala Leu Leu Arg Leu Arg Arg Leu Arg Glu Glu Gly Glu Glu
50 55 60

Pro Leu Arg Leu Leu Gly Ala Leu Ser Trp Gln Phe Ala Leu Leu Ala
65 70 75 80

Arg Ala Phe Phe Leu Leu Arg Glu Asn Pro Arg Pro Lys Glu Glu Asp
85 90 95

Leu Ala Arg Leu Glu Ala His Pro Tyr Ala Ala Lys Lys Ala
100 105 110

<210> 190

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 190

gtggtgtcta gacatcataa cggttctggc a

31

<210> 191

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR Primer

<400> 191

gagggccacc actttctcca ctttctc

27

<210> 192
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR Primer

<400> 192
ctccgtcctg gagaaggacc ccaag 25

<210> 193
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR primer

<220>
<221> primer_bind
<222> (15)
<223> S at position 15 can be either C or G

<220>
<221> primer_bind
<222> (27)
<223> S at position 27 can be either C or G

<400> 193
cgcgaattca acgcscctcct caagacscct 29

<210> 194
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR primer

<400> 194
gacacttaac atatggtcat cgcccttcacc g 31

<210> 195
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR primer

<400> 195
gtgtgtgaat tcgggtcaac gggcgaggcg gaggaccg

38

<210> 196
<211> 10
<212> PRT
<213> Deinococcus radiodurans

<400> 196
Val Ile Leu Asn Pro Gly Ser Val Gly Gln
1 5 10

<210> 197
<211> 10
<212> PRT
<213> Methanococcus jannaschii

<400> 197
Tyr Leu Ile Asn Pro Gly Ser Val Gly Gln
1 5 10

<210> 198
<211> 10
<212> PRT
<213> Thermotoga maritima

<400> 198
Leu Val Leu Asn Pro Gly Ser Ala Gly Arg
1 5 10

<210> 199
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR primer

<400> 199
ctggtaacc cgggctccgt gggccagc

28

<210> 200
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: polypeptide

<400> 200
Leu Leu Val Asn Pro Gly Ser Val Gly Gln
1 5 10

<210> 201
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR primer

<400> 201
ctcgaggagc ttgaggaggg tgttggc

27

<210> 202
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: polypeptide

<400> 202
Ala Asn Thr Leu Leu Lys Leu Leu Glu
1 5

<210> 203
<211> 32
<212> PRT

<213> Deinococcus radiodurans

<400> 203

Gly Phe Gly Gly Val Gln Leu His Ala Ala His Gly Tyr Leu Leu Ser
1 5 10 15

Gln Phe Leu Ser Pro Arg His Asn Val Arg Glu Asp Glu Tyr Gly Gly
20 25 30

<210> 204

<211> 32

<212> PRT

<213> Caenorhabditis elegans

<400> 204

Gly Phe Asp Gly Ile Gln Leu His Gly Ala His Gly Tyr Leu Leu Ser
1 5 10 15

Gln Phe Thr Ser Pro Thr Thr Asn Lys Arg Val Asp Lys Tyr Gly Gly
20 25 30

<210> 205

<211> 32

<212> PRT

<213> Pseudomonas aeruginosa

<400> 205

Gly Phe Ser Gly Val Glu Ile His Ala Ala His Gly Tyr Leu Leu Ser
1 5 10 15

Gln Phe Leu Ser Pro Leu Ser Asn Arg Arg Ser Asp Ala Trp Gly Gly
20 25 30

<210> 206

<211> 32

<212> PRT

<213> Archaeoglobus fulgidus

<400> 206

Gly Phe Asp Ala Val Gln Leu His Ala Ala His Gly Tyr Leu Leu Ser
1 5 10 15

Glu Phe Ile Ser Pro His Val Asn Arg Arg Lys Asp Glu Tyr Gly Gly
20 25 30

<210> 207

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 207

catcctggac tcggccacc tcctcaccga 30

<210> 208

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: polypeptide

<400> 208

Ile Leu Asp Ser Ala His Leu Leu Thr
1 5

<210> 209

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 209

gaggaggttag ccgtgggccg cgtggagctc cac

33

<210> 210
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: polypeptide

<400> 210
Val Glu Leu His Ala Ala His Gly Tyr Leu Leu
1 5 10

<210> 211
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR primer

<400> 211
ggctttccca tatggctcta caccggctc ac 32

<210> 212
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR primer

<400> 212
gcgtggatcc acggcatgt ctctaagtc 29